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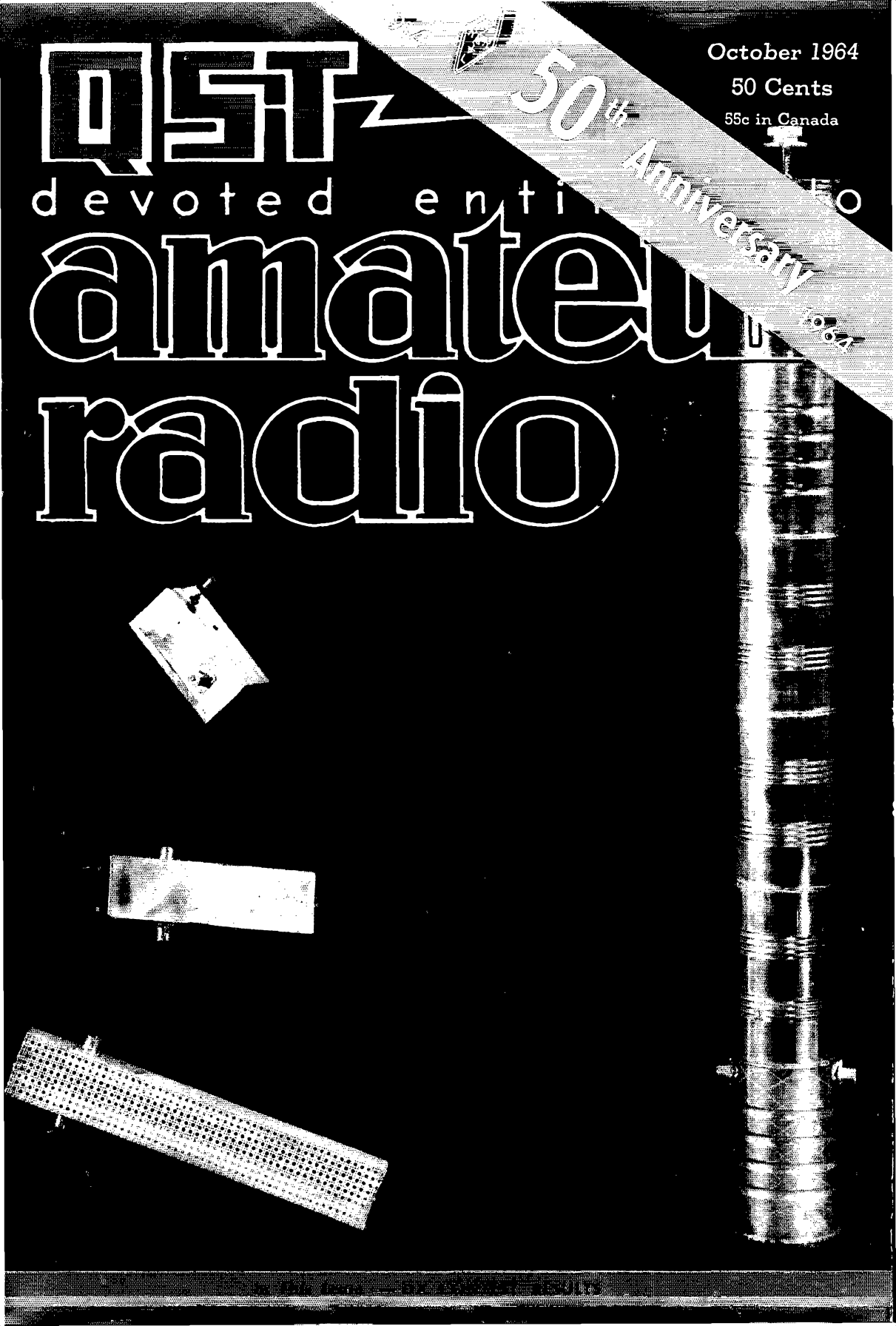
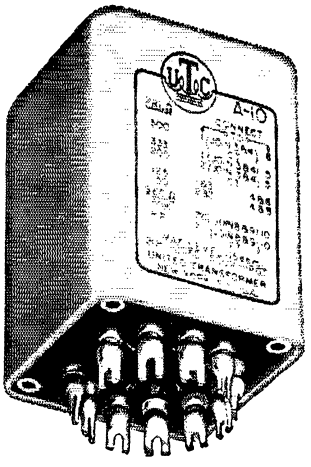


ULTRA-COMPACT™
"A-SERIES"

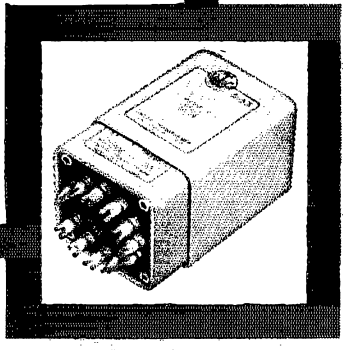
PIONEERS IN MINIATURIZATION

AUDIO TRANSFORMERS & INDUCTORS



TYPE A CASE

Length	1½"
Width	1½"
Height	2"
Mounting	1⅝" sq.
Screws	4-40
Cutout	1⅜" dia.
Unit Weight	½ lb.



Hipermalloy Shield (A-33) shown slipping over "A"-line unit

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For over thirty years, UTC has pioneered in the design, development and production of transformers, inductors, electric wave filters, magamps and high Q coils.

UTC's ULTRA-COMPACT, A-SERIES, are small lightweight audio units, ideally suited to remote amplifier and similar compact equipment. High fidelity is obtainable in all individual units, frequency response within the series extending from 10 to 50,000 cycles ± 2 db. All units except those carrying DC in primary, employ a true hum balancing coil structure, which combined with high conductivity outer case, effects good inductive shielding. The die cast case provides top and bottom mounting. These units are adaptable for printed circuit use.

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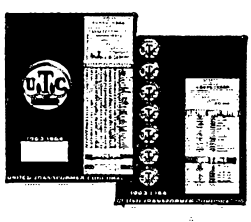

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In 1933, we had less than a dozen competitors. In 1964 we have over two dozen (at last count). Naturally, they all want to be the leader.

Early in the game, we learned that staying ahead of the crowd would depend on two things: Dedication to the needs of *all* amateurs; and very superior, *progressive* engineering.

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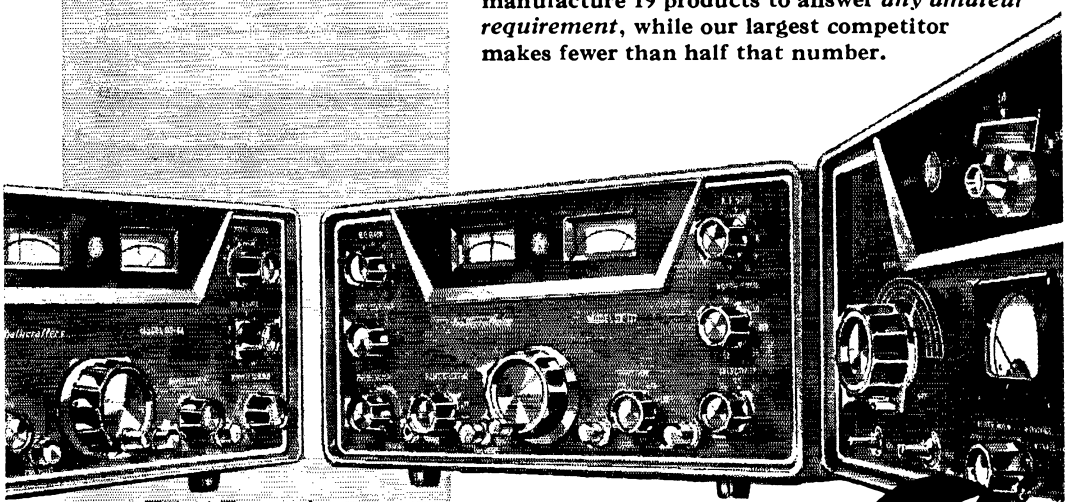

- HT-44 Transmitter
- SX-117 Receiver
- HT-45 Amplifier

- SR-150 Transceiver
- SX-122 G.C. Receiver

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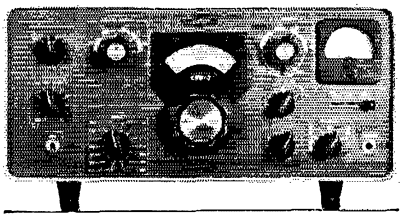

COLLINS

QST

OCTOBER 1964

VOLUME XLVIII • NUMBER 10

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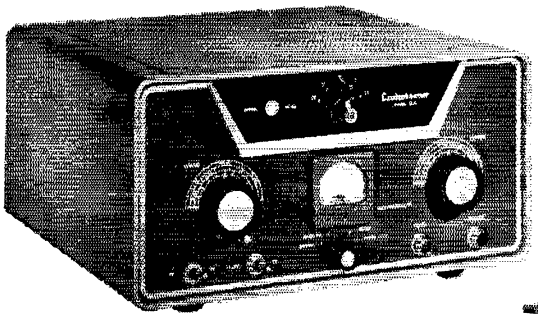
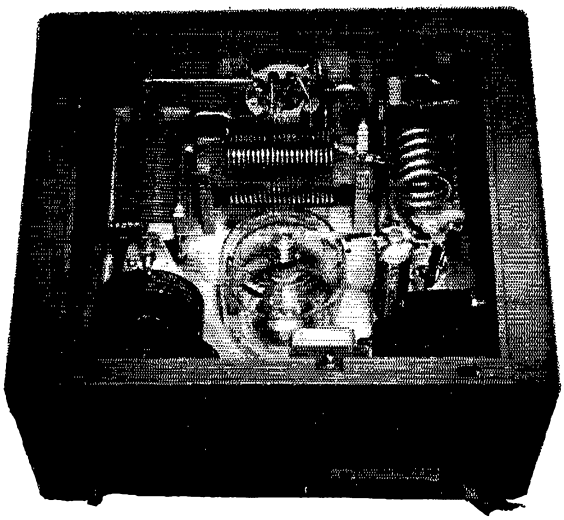
—CONTENTS—

EIMAC

3-400Z triode is featured in Hallicrafters desk-top HT-45 Linear Amplifier

Below you see the Hallicrafters HT-45 Linear Amplifier designed for one kilowatt service: continuous, key-down rating! This popular amplifier provides commercial service reliability and improved linearity, thanks to Eimac's 3-400Z zero bias triode. The original-design 3-400Z eliminates costly and bulky screen and bias power supplies. Power—Dependability—Quality! That's what you expect and get in the HT-45. And that's what you can get when you design your linear amplifier with Eimac's 3-400Z. For additional information on this tube—and its big brother, the 3-1000Z—please write: Amateur Service Department, Eitel-McCullough, Inc., San Carlos, California.





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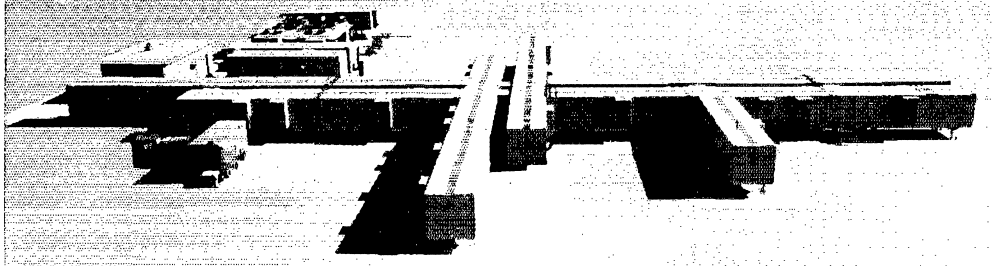

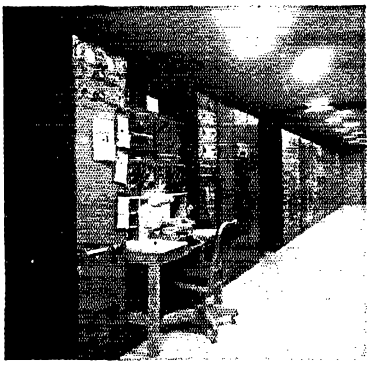

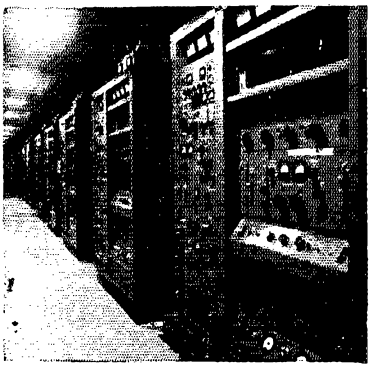

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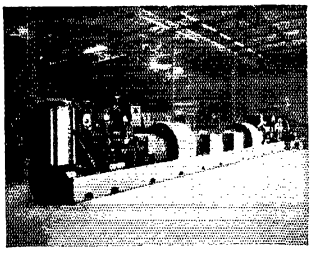

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THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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..."

DOCKET 9295 *ET SEQ*

As background for recent spirited discussions of the amateur licensing structure, our historical section this month treats a period of special significance.

At its 1948 meeting, the League's Board of Directors had recommended to FCC (1) a 50-kc. expansion of the 75-meter phone band, because of increased amateur voice interest; (2) a 16-w.p.m. code test for future Class A exams, to give more meaning to that license class; and (3) a one-year "apprenticeship" for new amateurs before permitting them use of voice below 29.7 Mc., for the purpose of raising the standards of voice operation.

This created a stir in amateur ranks, and two small, short-lived, rump organizations were formed to fight the League's proposals — each diametrically opposed to the other. The phone group called itself the "National Amateur Radio Council," which proposed a 100-kc. expansion of 75-meter phone, that 14-Mc. phone also be expanded, and that the League's requests for phone upgrading be denied. The c.w. group took the name, "Society of American Radio Amateurs," and proposed *no* phone expansion, exclusive sideband segments within then-current voice bands, and a 20-w.p.m. test for Class A, including renewals.

As a result, the Commission issued its notorious Docket 9295, which aimed at reorganization of the entire amateur license structure. Among other things, FCC proposed to add the ARRL-requested 3800–3850-kc. segment for voice, but only for sideband or n.b.f.m. More to the immediate point, FCC proposed that the old Class A be abolished; that a brand-new Extra Class, with a 20-w.p.m. code test and an extremely difficult technical examination, be thenceforth the sole means of entry into the restricted (75- and 20-meter) phone bands; and that all Class A licensees, upon expiration, would have to take the new Extra exam in order to maintain their special voice privileges.

This was incentive licensing with a vengeance!

Going far beyond ARRL's request for a modest upgrading of standards, it created an even greater furor in ham ranks. The League, with NARC and SARA generally in agreement, finally won many of its points, including retention of the Class A (Advanced Class) for former holders as the means of restricted privileges, but the Commission continued to insist on the Extra Class for newcomers to those bands.

Then, in a surprise move, FCC suddenly proposed to open all voice bands to all amateurs (except the newly-created Novices and Technicians). Despite strenuous League opposition, including petitions for rehearing, and despite many comments directly from amateurs in the ratio of more than 8 to 1 also opposed, the Commission made its proposal *final*.

The latter action, which most amateurs viewed as downgrading our standards, became the subject of extensive discussion through subsequent years. Recognizing a problem, individual amateurs, the League's Board and its study committees, and even FCC itself, made exploratory attempts at a solution — all without success. But the ground work had been laid for what finally erupted a year ago as the ARRL proposal to return to a more extensive incentive-licensing structure.

We think it reasonable to assume that if a complete rejection of RM-499 were FCC's intention, it would have been forthcoming long before this. When FCC does act — before the end of the year would be our hope — we shall all have both an indication of the Commission's views and another opportunity for all amateurs and groups to express opinions. Here let us offer another hope: that whatever action the Commission takes, rather than produce a recurrence of the misunderstandings — and outright deliberate distortions of fact in some instances — which generated so much flame and smoke a year ago, we all give a calm and considered appraisal and express reasoned opinions, whether pro or con.

STAMP

On page 99 of this issue we provide further details for obtaining first-day souvenir envelopes at the time of release of the postage stamp honoring amateur radio operators.

You will want at least one as a personal memento in your station records. This is also an opportunity to accomplish some good public-relations work among your neighbors and friends, or to greet other members of the ham fraternity. But let us underscore the fact that while the stamp will be available at all post offices for general use commencing the day after its initial release, the official ARRL envelope must be ordered in advance so that it may carry the special postmark at the first-day city and thus be a valuable and historical souvenir. It is available only from the League. And it cannot be backdated, so please act promptly. QST

COMING A.R.R.L. CONVENTIONS

October 2–3 — Ontario Province, London
October 17 — Michigan State, Grand Rapids
October 31 and November 1 — Oklahoma State, Lake Texoma
January 23–24, 1965 — Florida State, Miami
April 24–25, 1965 — New England Division, Swampscott, Mass.
July 2–5, 1965 — ARRL National, San Jose, Calif.

MICHIGAN STATE CONVENTION

Grand Rapids, Mich. October 16–17, 1964

The 1964 Michigan State ARRL Convention will be held at Grand Rapids on Saturday, October 17. This will be the 17th annual convention sponsored by the Grand Rapids Amateur Radio Association, Inc.

The convention will get underway for the "early birds" on Friday, the 16th, at 8:00 P.M. in the Pantlind Hotel. An initiation ceremony for the Royal Order of the Wouff Hong will take place at midnight.

Registration will begin at 9:00 A.M. Saturday morning, the 17th, in the hotel and at the Grand Rapids Civic Auditorium. One of the main events will be the swap and shop in the Black and Silver Room of the Auditorium, which will run from 10:00 A.M. to 5:00 P.M. Other activities will include exhibitors' displays; s.s.b.; eyeball QSOs; Wolverine, Michigan BR and MEN Operators meeting; Michigan Post Office Net meeting; v.h.f; MARS; YLRL meetings; entertainment for all the XYLs and YLs; and an ARRL Forum under the direction of ARRL Great Lakes Division Director Dana E. Cartwright, WSUPB. The evening event will consist of a discussion, and possibly a demonstration of the LASER program, presented by Lear-Siegler, Inc. Registration donation is $2.00 at the convention, and only $1.75 pre-convention.

For pre-convention registration, and details on the convention or hotel reservations, contact Mr. Howard Rotrock, K8HQT, 401 Hoyt SE, Grand Rapids, or write to the Grand Rapids Amateur Radio Association, Box 1333, Grand Rapids, Michigan 49501.

OKLAHOMA STATE CONVENTION

Lake Texoma October 31 and November 1

The Oklahoma State ARRL Convention will be held at Lake Texoma Lodge on Saturday and Sunday, October 31 and November 1. Pre-registration for amateurs and participating guests is $3.00; other guests, no charge. Pre-registrations should be sent to Oklahoma Section ARRL, P.O. Box 12357, Oklahoma City. For further convention information, contact Mr. T. W. Stevens, W5VCJ, General Chairman, at the above address.

Strays

In the wake of the U.S. reciprocal operating law, cracks are appearing in the attitudes of other countries as adamant as the U.S. has been about requiring citizenship for radio operation. In the United Kingdom, the wall has been twice breached recently. U.S. amateurs were permitted to operate G3NMS at a rally held by the Amateur Radio Mobile Society of July 4–5, and Belgian amateurs were permitted to operate GB3RS, the headquarters station of the Radio Society of Great Britain, August 7–9 during their visit to London. Both of these permissions have been granted as an exception to the citizenship rules, which remain in effect. Nonetheless, such actions appear as signs of change and are most welcome to the amateur fraternity.

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Larry DeMilner, W8NRB, one of the hosts with the USIA Communications Exhibit now touring the Soviet, received permission to operate from Leningrad signing W8NRB/UA1. Larry plans to seek additional permission to operate from Kiev and Moscow during October and December.

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Feedback

In "Power-Saving Conversion V.F.O.", September, 1964, *QST*, the schematic diagram, page 24 shows the r.f. output coming through a 0.01μf. capacitor from the collector of transistor, Q_4. The r.f. output should be connected to the emitter of Q_4 through the 0.01 μf. capacitor.

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The Maryland-D. C. section winner for the June VHF QSO Party, reported in September *QST*, should be shown as W4TYH/3 who operated solo during the test.

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In Fig. 2 of the article, "An I.F. Tracking Filter for Weak-Signal Reception", by Burhans, in *QST* for September 1964, the connection between the plate of the 6AU6 and the 0.01 μf. capacitor at the bottom of the primary of transformer, T_1, should be deleted.

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appear on page 35, August *QST*. Let's hear from *you*.

During August the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1JWV	W4VYC	WA9ECX
W1ZLX	W4ZRE	W9GML
WB2BHO	K5GUD	K9ZLA
WN2KMT	K5MOF	WØBHA
WB2MBC	WA5PUE	WAØETV
WA2PCM	K7MKW	WAØHPH
WA3AFE	W7OZX	WØNUT
W4DLA	W8CHT	KL7EKB
WA4FJM	K8DIU	VE2DR
K4KDN	W8FWQ	ZD3A
WA4PSA	W8LCA	ZL3JO
WA4STL	WA9CSJ	ZL4JF
K4UWR		7Q7RM

With frequencies above, below and in between our v.h.f. bands solidly occupied by commercial, military and other essential services, keeping transmitter radiation on the intended frequency only is of utmost importance to the v.h.f. operator. Preventing receiver overloading and other spurious reception is an almost equally critical matter. One of the simplest gadgets that is capable of serving both these ends is the coaxial-tank filter. Here is how you can make them easily and at low cost.

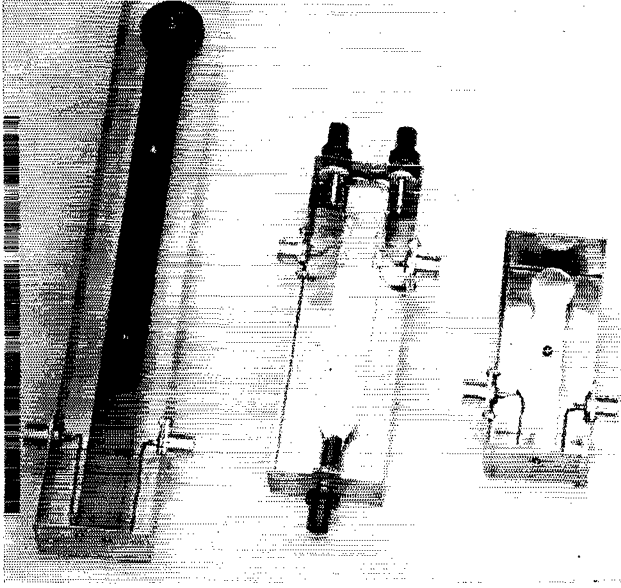


Fig. 1—Interior views of the filters for 144, 220 and 432 Mc. The 220-Mc. model, 8 by 2½ by 1½ inches in size, tunes to 144 Mc. also, with the capacity near maximum. It and the 432-Mc. filter are made of flashing copper.

BY EDWARD P. TILTON, *W1HDQ

Coaxial-Tank V.H.F. Filters

How and Where to Use Them

USE of the v.h.f. spectrum being what it is today, almost everyone on the bands from 50 Mc. up may have interference to or from services on adjacent frequencies. This may be a minor annoyance — an unwanted signal somewhere in the tuning range of a converter-receiver combination — or it can be a major crisis, such as developed recently when a 2-meter operator near one of the country's busiest airports was unknowingly radiating a signal on a frequency used by incoming aircraft.

A simple and inexpensive way of solving these and other unwanted-signal problems is much in demand. While it is not a miraculous cure for all the harmonic and overloading ills that v.h.f. men are heir to, the coaxial-tank filter is a useful tool. Examples shown here cost little, and are easy to build and adjust.

Filter Uses

High-pass, low-pass and band-pass filters can be bought or built for most requirements, but the coaxial filter has merit in that it can reject energy both above and below the desired range, and it can be adjusted readily whenever the operating frequency is changed enough to require it.

Consider the surplus SCR-522 and ARC-5 transmitters, so popular with 2-meter men. These use an 832 tripler to drive an 832 amplifier. All stages are capacitively coupled, and the circuits have low Q, so the output contains harmonics of the oscillator frequency that fall in several TV channels, the f.m. broadcast band, and even on some frequencies used by vital communications services. The well-known ability of these rigs to interfere with TV Channel 10 results from the fourth harmonic of 48 Mc., as well as the desired third, appearing in the output.

The usual TVI precautions (shielding, power-lead filtering) are only partial cures, and revamping the equipment to eliminate unwanted frequencies may be more of a job than a cheap surplus rig is worth. Suitable L-C filters for the Channel 10 problem have been in the *Handbook* for years, but they do nothing for harmonics of exciter frequencies that fall below or near the operating frequency.

For various good reasons, use of 6 or 8 Mc. for the starting frequency is almost standard amateur v.h.f. practice, but unless fairly stiff

* V.H.F. Editor, *QST*.

design precautions are taken, all harmonics of the oscillator frequency will appear in the output to some degree. The more troublesome examples are the 7th harmonic of 8 Mc. and the 9th of 6-Mc. oscillators used for 50-Mc. work, falling in Channel 2, and the 10th harmonic of 8.4 Mc. in Channel 6. A good coaxial-tank filter properly adjusted is quite effective in dealing with these and other harmonic problems.

With s.s.b. gaining ground in v.h.f. work, the coaxial filter has another application: weeding out unwanted products of the heterodyning process inherent in most s.s.b. designs for v.h.f. use. A good way to use the filter is in the line between the mixer or driver and the final. The power level is low at this point, so an ordinary receiving-type variable capacitor will suffice for tuning a filter so used.

The coaxial filter is also useful in receiving. If you live close to TV, f.m. or other nonamateur v.h.f. stations you're likely to find your converter-receiver combination less than perfect in its ability to reject signals other than those you want to hear. This may show as cross-modulation of amateur signals by the commercial ones, or as spurious responses resulting from signals being heterodyned into the tuning range by various harmonics of the oscillator-multiplier stages of

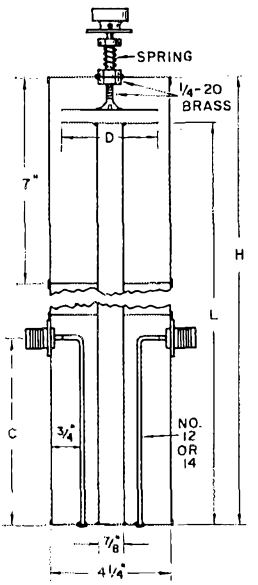


Fig. 2—Cut-away view of a filter made from large-size fruit-juice cans. The inner conductor is ¾-inch copper pipe (⅞ inch o.d.) in each case. The tuning disks and top and bottom covers are made of flashing copper. Black areas indicate soldering. Fixed disk at top may be covered with 1/32-inch Teflon sheet to prevent shorting the capacitor at close spacings.

Dimension	50 Mc.	144 Mc.	220 Mc.
H	42 in.	14 in.	7 in.
L	40¾	12¾	5¾
D	3	3	2½
C	6	2½	2

the converter. Such things can be minimized by good converter design, but if you have them in an otherwise satisfactory setup the coaxial filter may be an easy way out.

An example of such use of a coaxial filter is the case of a long-time friend of the writer who moved to Houston, Texas. Thinking to outfox the TVI problem, he chose a home site close to KPRC, the Houston Channel 2 station. He had no TVI, with the station blanketing the area as it does, but the 2-meter band was so full of blips and buzzes that operation was all but impossible. A simple coaxial tank in the antenna line, tuned to the middle of the range he wanted to work over, eliminated the TV signals, with hardly any effect otherwise on the sensitivity or transmitting effectiveness of his 2-meter gear. The "garbage" was being put there by the receiver, not by KPRC!

Some Filter Considerations

To be effective a coaxial filter must have high *Q*. Large-sized conductors are a must, and connections (particularly at the shorted high-current end) must be the best. Coupling into and out of the filter must be light; if you want really high rejection close to the resonant frequency you must take some insertion loss. How much depends on the job you have to do.

Materials for construction of filters are inexpensive and easy to come by. Copper or brass pipe is wonderful if you can afford it, and you have a torch or big iron for soldering. Silver plating is nice, if you can do it or get it done inexpensively, but you can live without it. Flashing copper, sheet aluminum or ready-made chassis are plenty good enough, and even fruit-juice cans do very well. The housing can be a rectangular box and the inner conductor a flat strip, if these are easier for you to handle than true coaxial construction.

A coaxial tank is a quarter-wave line, shorted at one end and tuned at the other. Being tuned capacitively, it is less than a full quarter-wavelength, but preferably it should be as long as you can make it and still tune the desired frequency range. The gargantuan 50-Mc. device at the right side of our cover photo is 42 inches (6 large-sized fruit-juice cans) long. A 144-Mc. filter is about 15 inches, so two juice cans or a standard 17-inch chassis may be used. One can will work on 220, and a single filter can be made that will tune both 144 and 220. A box for 432 need be no more than about 5 inches long.

Coupling loops are not very fussy, and their position with respect to the inner conductor may be adjusted to suit the requirements your filter must serve. Loose coupling increases insertion loss, but improves selectivity. Tight coupling can keep loss low, but the filter then rejects only frequencies well away from the desired tuning range.

Insertion loss can be kept low and the selectivity curve improved by using two or more filters in series. This is done in some surplus gadgets mentioned later.

The outer-to-inner conductor diameter ratio should be roughly 4 to 1. The whole assembly should be rigid, and the inner conductor supported in some way to insure that it will stay put. Supports should preferably not be near the hot end of the line, as any insulation here will lower the *Q* of the circuit.

The tuning capacitor should be the best available, if a conventional variable is used at all. Disk tuning is preferred. A tuning system like that shown in Fig. 2 has no insulation losses, and no bars or frame to introduce parasitic resonances.

Scrounging for Surplus

There are lots of goodies on the surplus market. Don't ask us for sources, but keep your eyes and ears open. Watch the ham auctions; a fellow on 75-meter sideband won't place much value on a coaxial tank a foot long, and he may have inherited some through MARS or other connections.

A nice coaxial tank may be found in the TS-1/ARR-1 Test Oscillator, a drug on the surplus market for years. It is gold-plated, and has a fine-thread disk capacitor that tunes it through both 144 and 220, without modification. BNC connectors can be mounted on the sides, and by drilling holes in the bottom you can fish the coupling loop leads out and solder them externally. The circuit has excellent *Q*.

There are some beautiful dual filters, designed for use where several transmitters are running together, on frequencies separated but all in the v.h.f. range. These are excellent, mechanically and electrically; gold-plated, with teflon-insulated tuning plungers, N-type coaxial fittings, directly-calibrated dials and all the fixings. Insertion loss is around one db., with fine rejection of unwanted frequencies. Numbers to look for: F-194/U, 142 to 163 Mc., F-197/U, 205 to 226 Mc.

A "heavyweight" of cast brass, use and source unknown, has four sections, N fittings and adjustable plungers. It is sharp as a razor, and may be tuned to 432 Mc. The only identification we have is the number: 162-552.

Making Your Own

A disk capacitor like that shown in Fig. 2 provides up to about 15 pf. before the spacing gets too small for high power. At 50 Mc. this will resonate a line about 75 percent of a quarter wavelength long. At 144 it will permit use of lines as short as ⅛ wavelength. The shortening effect of tuning capacitance increases with frequency, but at 220 Mc. or higher size is no problem. The effectiveness of the line decreases somewhat with increasing tuning capacitance, and the more the line is shortened the larger it must be made to maintain a given *Q*.

As can be seen from our cover and Fig. 2, a 50-Mc. tank is quite a conversation piece, but it may be worth the trouble. The outer cylinder is made of 6 large fruit-juice cans, ends removed, soldered together to make a 4¼-inch cylinder 42 inches high. (One brand of juice sold in such cans is appropriately named "Hi C"!) After

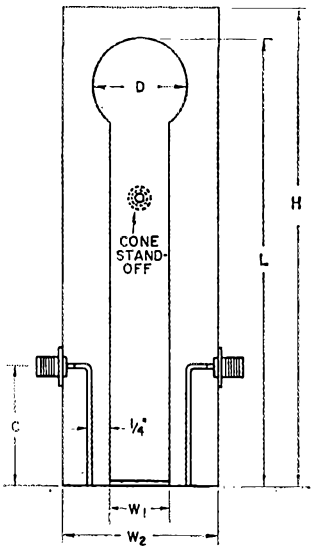


Fig. 3—Dimension drawing of filters for 144, 220 and 432 Mc. The disk that comprises the fixed plate of the capacitor may be cut from the same piece as the inner conductor, or made separately and bolted or soldered on. A standard chassis of the nearest available size may be used for the outer conductor of the line, provided that the inner is approximately as shown below. Coupling loops may be terminated with soldering lugs in aluminum models. Inner conductor located at the middle of the outer, in both dimensions, is supported on a ceramic cone insulator.

Dimension	*144 Mc.*	*220 Mc.*	*432 Mc.*
H	16–17 in.	10 in.	5 in./
L	15	9	4¾
D	1½	1½	1
C	2½	2	1½
W_1	1	1	¾
W_2	2½–3	2½	2¼*

***Though unit pictured is made of flashing copper, a standard Minibox may be used for aluminum construction**

cutting out the ends, tin the folded-over edges on a large soldering iron, running the edge over the surface of the iron, feeding solder against it constantly. End-to-end soldering is surprisingly easy and neat, if a wedge-tip iron is used with a small amount of additional solder.

Place a can end down on a sheet of flashing copper or brass and mark around the edge with a pencil or scriber. Cut along the line and tin the edge lightly all around. Tin the center over an area just larger than the copper pipe inner conductor. Tin the end of the latter, and then stand it erect on the disk and solder in place with a large iron or torch. We managed this with a 100-watt iron, but a 300-watt job would make it easier. Two smaller irons (and at least three hands) also make light work of this heavy job. Solder the tuning disk on the other end of the pipe in the same manner.

If you're going to do much work with tubing a pipe cutter is a good investment. It makes a clean cut, exactly perpendicular to the pipe axis, a trick not readily turned with a hacksaw.

Cut a top cover plate like the bottom one, and drill a hole about ⅜ inch in diameter at the center. Assemble the ¼-20 brass screw and nuts as shown at the top of Fig. 2, making sure that the screw is centered in the hole. Solder the nuts to the top and bottom of the cover, and you have a threaded bushing for your lead screw. Clean the threads with alcohol or other flux solvent, put a spring and tension nut on the top of the shaft, solder the top disk to the screw head, and you're ready for final assembly.

Tin the edges of the top and bottom covers to a width of about ⅛ inch, all the way around. Tack them temporarily in place at three or four points, until you check the tuning range and operation of the filter. Once it is found to be satisfactory, do a finished soldering job all the way around.

Adjustment of coupling loop position is possible if you cut some windows in the sides of the bottom can, just below or to the side of the coaxial connectors. Cut up another can to make covers for these holes, and fasten them in place with self-tapping screws when adjustments are completed.

The all-aluminum filter for 144 Mc. can be made entirely with ordinary hand tools, if a standard chassis is used. The 3 by 4 by 17-inch size is fine. Copper disks like those used in the juice-can filter can be used, but a convenient lead-screw and bushing combination may be made using 6-32 hardware and a Millen A066 Shaft Bushing. The latter part takes a 6-32 thread nicely. Bushings and screws are easily taken care of in all-copper construction.

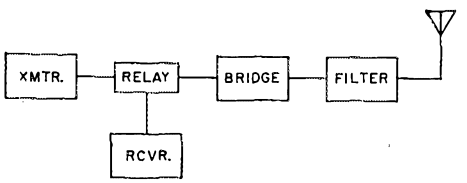


Fig. 4—Method of connecting the coaxial filter, when it is to be used for both transmitting and receiving.

The 2-color effect in the aluminum filter is the result of spray-painting, for photographic purposes only. Out of curiosity, we checked filter performance before and after painting, and we definitely do *not* recommend the paint job.

The filters for 220 and 432 Mc. are made entirely of flashing copper. This is cheap and easy to work, and it is strong enough for small assemblies. Note that the filter for 144 and 220 Mc. has variable series capacitors. These were added in order to tune a single set of loops for both bands. They are not needed in a single-band filter. Admittedly, the two-band business is something of a compromise. Dimensions for juice-can filters for 144 and 220 Mc., as well as 50, are given under Fig. 2.

Adjustment

The best way to set the filter in a feed line that is matched to its antenna is with an s.w.r. bridge. If you want the filter to work for both transmitting and receiving, connect it as in Fig. 4. With the transmitter running, adjust the filter for minimum reflected power. This should be zero, or close to it. The filter will tune very sharply with the coupling as shown in Fig. 2. Don't adjust for maximum forward reading; this is meaningless unless the reflected is close to zero. Adjustment for maximum forward should be made at the transmitter only, not at the filter.

On receiving you may find that tuning the filter will peak signals at some point other than where the filter was set as above. If so, this is a price you pay for filter rejection. Adjust the filter for best signal-to-noise ratio if you like, but the right way is to work over the receiver input circuit for best results with the filter tuned *properly*. All this assumes that the antenna or dummy load is close to 50 ohms. With appreciable s.w.r. on the feed line all bets are off, and adjustment of the filter will be a rather hit-or-miss proposition. Adjust for minimum reflected power, unless an actual test for maximum rejection of the unwanted signal (transmitting or receiving) can be made.

Coupling into and out of the filter is the principal factor in its selectivity. Keeping the 9th harmonic of 6 Mc. out of Channel 2 is a tough assignment. It means rejecting a signal at 56.25 to 57 Mc. (for low-end operation on 6) and passing one at 50 to 50.7 Mc. Our tin-can colossus will do it handily. Set up as shown, it has about 10 db. rejection one megacycle either side of the resonant frequency. Rejection in the critical part of Channel 2[1] with the filter set for 50.2 Mc. is on the order of 40 db., which is more than enough.

Insertion loss on receiving is about 1.4 db. with this coupling. If this sounds bad, remember that most v.h.f. feed lines dissipate as much or more, and 1.4 db. will just about show on a received signal if a sharp observer is warned to look out for it. If you don't tell him, he'll probably never notice the change.

You may not need this much protection, in which case you can push the loops closer to the inner conductor and get insertion loss down under one db. Maybe you can spare a little drive to your amplifier. If so, put the filter in the line between the driver and final grid circuit, if you don't need filter protection on receiving.

Insertion loss is least troublesome on the 50-Mc. band. Here receiver noise figures are usually more than adequate, so filter loss is a very minor factor in receiving. Transmitter power loss is slight, and can always be made up by increasing power, unless you are already at the legal limit. Fortunately, the toughest jobs a filter is likely to be called upon to handle are usually associated with 50 Mc. and Channel 2.

Keeping Channel 13 out of a 220-Mc. converter calls for real selectivity. Two or more filters in series may be needed here. You may want to build high-*Q* protection into the 220-Mc. con-

[1] The most critical part of a TV channel for picture interference is the lower portion. See charts in the *Handbook*, interference chapter.

verter. One way of doing this was shown in a beer-can converter for 220 by WSJLQ some years ago.[2]

Situations like the 192-Mc. signal appearing along with the desired 144 are fairly easily handled, so coupling in a filter for this job can be adjusted for low insertion loss.

Increasing use of u.h.f. TV will bring a demand for selectivity in 432-Mc. circuits. A crystal-controlled converter for 432, with its several multiplier stages, is very likely to beat in TV hash from a nearby u.h.f. TV station. Need for elimination of u.h.f. harmonics from transmitters must be kept in mind for the u.h.f.-oriented future of home TV.

What the Filter Won't Do

Don't expect a coaxial filter to be a TVI cure-all. If your rig is radiating harmonic power through its cabling, from the circuits of the transmitter themselves, or through the a.c. line, keeping the offending energy out of the antenna may not do much good. This is particularly true in congested areas, where the receiver being interfered with is close to the transmitter. A filter will do nothing whatever for audio interference, and much of v.h.f. TVI is this variety. It won't help other troubles that result from receiver deficiencies, such as the overloading from 50 Mc. that occurs so commonly on the lower TV channels.

Your own TV set is usually a good check. If you can run your rig on a dummy load with no TVI you need only keep harmonics out of the antenna to make your station legally "clean." A properly-adjusted filter will almost certainly do this. Any interference that follows will then have to be taken care of at the receiver.

If you reach the point of an FCC check, you may have to show not only that your own receiver has no interference, but that you actually have no detectable signal in the TV channels affected. They may listen for your 7th harmonic of 8 Mc. in Channel 2, for example, and if they hear it you will not be cleared, even though the real culprit is fundamental overloading of the TV set by 50-Mc. energy. With a properly shielded and filtered transmitter, a coaxial filter in the antenna line may result in a clean bill of health for your setup, whereas without the filter you might still be suspect.

Most important of all, TVI is essentially a public-relations problem, not a technical one. Every form of the plague can be cured, but some of the medicine is not easily administered. Your first duty is to learn the hows and whys. The *Handbook* has them in full, in the v.h.f. transmitter design chapter, as well as in the one on interference. If you can run down the cause of the trouble, talk intelligently about it, and then recommend an effective cure, the battle will be at least half won. A coaxial filter may help — but don't just put one in and hope for the best! QST

[2] "The World Above 50 Mc.," Oct. 1957, *QST*, p. 91.

Hamfest Calendar

Florida — The Hillsborough Amateur Radio Society (HARS) will hold an old-fashioned hamfest on Sunday, October 11, at Sulphur Springs Recreation Area. There will be free lunch with each registration ticket, as well as sheltered swap tables and acres of free parking. For further information contact HARS at P.O. Box 8373, Tampa 4, Florida.

Connecticut — The Tri-City Radio Club, Inc., annual hamfest will be held on October 10, at the Crocker House Hotel, State Street, New London, Conn. Tickets are $5.50 each, which includes a steak dinner and registration. Activities include technical talks, swap-and-shop table, and visits to local military activities. Registration and information available from General Chairman Robert York Chapman, W1QV, 28 South Road, Groton, Conn.

New Jersey — The annual club dinner of the Irvington Radio Amateur Club will be held on October 17 at the Community Building on Clinton Avenue in Irvington, New Jersey. For more information write David Rettig, K2VOB, 240 W. Kinney Street, Newark, New Jersey.

New York — The Rockaway Amateur Radio Club will hold their fall auction Friday evening, October 23. The auction will take place at the Daniel M. O'Connell Post 272, American Legion Hall, 301 Beach 92nd St., Rockaway Beach, New York. Admission is one dollar, which will include refreshments. For information, write Alfred G. Smith, WA2TAQ, P.O. Box 205, Rockaway Park, New York.

Pennsylvania — The Western Pennsylvania Mobileers are having their eighth annual hamfest, called the "Fall Round-Up", on October 23, at the Thad Stevens Fire Hall on Robinson Blvd. and Frankstown Road. Activities include a swap-and-shop session, entertainment, and refreshments. Additional details are available from Richard B. Wilson, K3IXN, 714 Jane Street, Pittsburgh, Pa.

Massachusetts — The New England DXCC will hold its 14th annual dinner meeting October 17, at the Motel 128, Dedham, Massachusetts, at the intersection of Routes 1 and 128. A roast top-sirloin dinner will be served. Festivities will start at 6:00 P.M., dinner at 8:00 P.M. Members and guests are invited. Tickets are $5.00. For reservations write (and make checks payable to) Leo Wilber, W1MV, 74 Bedford Street, Bridgewater, Massachusetts.

Ontario — The Ontario S.S.B. Dinner will be held on November 21 in Toronto. Tickets and information from Jerry, Halliday, VE3GH, 880 Bourke St., North Bay, Ont., Canada.

Strays

VE3KIT is the call of the club station of Heathkit (Daystrom Ltd.) of Canada. They're in Cooksville Ontario.

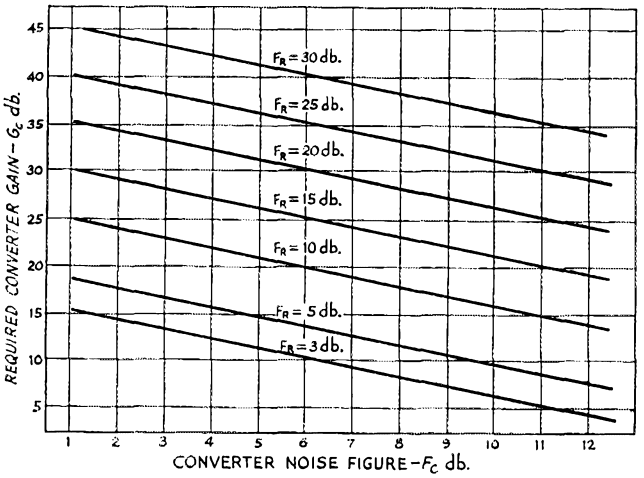


Fig. 1—Converter gain required for 0.1-db. increase in over-all noise figure vs. converter noise-figure alone.

The Effect of Converter Gain on Receiver Noise Figure

BY JAMES A. HALL,* W4TVI

The receiver in most amateur v.h.f. stations consists of a converter-communications receiver combination. An important factor which should be considered in the design and use of converters is the effect of converter gain on over-all receiver performance.

There is no "correct" gain for a converter. Any design must be a compromise between two extremes. Either the gain can be large, insuring that noise generated in the converter front end will completely override communications receiver noise, or the gain can be made small, thereby protecting the communications receiver from excessive signal strengths and the inherent dangers of cross modulation and overload. How then can the best compromise in converter gain be determined?

First consider how the noise factors of two amplifiers (or in this case, the converter and communications receiver) add:

$$F_T = F_C + \frac{F_R - 1}{G_C}$$

Where F_T = combined converter-communications receiver noise factor.
F_C = converter noise factor operating into a perfect communications receiver.
F_R = communications receiver noise factor.
G_C = converter gain.

* 109 Walton Drive, Lynchburg, Va.

NOTE:
F_T, F_C, F_R, and G_C are all *power ratios.*

Solving for G_C:

$$G_C = \frac{F_R - 1}{F_T - F_C}$$

Using this relation, the converter gain required for a given degradation in converter noise factor ($F_T - F_C$), when using a communications receiver with noise factor F_R, can be determined. Fig. 1 shows this information graphically for the case where the difference between F_T and F_C is 0.1 db. Degradation of 0.1 db. in converter noise

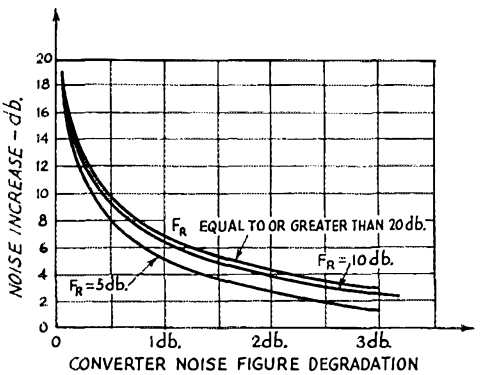


Fig. 2—Increase in total noise when converter is connected, as a function of degradation in converter noise figure.

figure results from a good compromise in converter gain in most cases. If the converter noise figure is very good or very bad, it may be desirable to choose a smaller or larger value of $F_T - F_C$.

For values of $F_T - F_C$ other than 0.1 db. add (or subtract) the appropriate value shown below to the required converter gain given by Fig. 1.

$F_T - F_C$	G_C Correction
0.05 db.	Add 3 db.
0.2 db.	Subtract 3 db.
0.3 db.	Subtract 4.9 db.
0.4 db.	Subtract 6.2 db.
0.5 db.	Subtract 7.3 db.
0.75 db.	Subtract 9.1 db.
1.0 db.	Subtract 10.4 db.

For example, a converter with a noise figure of 4 db. is to be connected to a receiver with a noise figure of 20 db. and a degradation in converter noise figure of 0.1 db. is allowed ($F_T = 4.1$ db.). From Fig. 1 the required converter gain is 32.2 db. To obtain a degradation of only 0.05 db. ($F_T = 4.05$) the gain must be increased to 35.2 db.

A simple check can be performed to determine what degradation your communications receiver is causing in converter noise figure. First disconnect the converter from the communications receiver. Connect a resistor equal to the converter output impedance across the communications receiver antenna terminals. Measure the noise output of the receiver. Remove the resistor and re-connect the converter (use a dummy antenna on the converter to simulate a "quiet" location). Note the increase in noise power. Using Fig. 2, the degradation in converter noise figure caused by the communications receiver can be determined. This curve is correct for any converter noise figure or gain.

In measuring the noise increase, care must be taken to avoid overload in the communications receiver. Also, an accurate meter should be used. Since only the noise increase, not absolute level, is important, an attenuator-meter arrangement can be used. An S meter reading will be unreliable at best. The use of a good high-frequency v.t.v.m. and a measurement point in the receiver i.f. amplifier as near the mixer as practical is recommended.[1]

From Fig. 2, note that an increase in receiver S meter reading of about 3 true S units (more than this with the liberal S meters found on many receivers) will be observed when a converter with the "proper" gain is connected.

If the receiver noise output increases by more than about 18 db. when the converter is connected, the converter gain should be decreased to minimize communications receiver overload and cross modulation. A convenient way to do this is by placing an attenuator in the line between the receiver and converter. A good estimate of the required attenuation can be made by subtracting the required noise increase from the actual noise increase as measured above. For example, if a noise-figure degradation of 0.1 db. is desired, Fig. 2 shows that a noise increase of 16 db. is required for $F_R = 10$ db. Assume a noise increase of 25 db. is measured when the converter replaces the dummy antenna on the communications receiver. The required attenuation is then approximately 25 − 16 db., or 9 db.

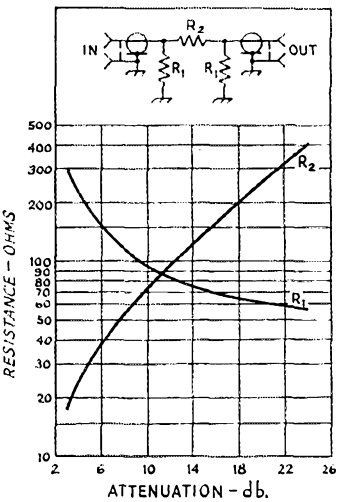


Fig. 3—Resistance values for construction of 50-ohm attenuators.

Fig. 3 shows the resistance values required to construct various attenuators for the usual 50-ohm receiver-input and converter-output impedance. In the above case (9-db. attenuator), $R_1 = 105$ ohms and $R_2 = 61$ ohms. Standard 5 per cent values of 100 ohms and 62 ohms are satisfactory. Check the noise increase with the attenuator in place to be sure that the desired converter noise-figure degradation has been obtained. When using Fig. 2, be sure to use the new value of F_R resulting from the use of the attenuator. F_R with attenuator = F_R original + attenuation. In the above case the new F_R is 10 db. + 9 db. or 19 db. If the converter output, attenuator, and communications receiver input impedances are not equal, the results may differ from those predicted.

Figs. 1 and 2 are equally useful in predicting the required gain for a pre-amplifier. Just substitute pre-amp. gain and noise figure for converter gain and noise figure. F_R becomes the noise figure of the receiver following the pre-amp. and F_T becomes the combined pre-amp.-receiver noise figure.

It has been shown that the characteristics of the communications receiver following a converter have a significant effect on over-all receiver performance. By using just enough converter gain, maximum freedom from cross modulation and overload in the communications receiver can be obtained without appreciable degradation of the converter noise figure. QST

[1] In this connection, see Huie, "A V.H.F. Noise Generator," *QST*, Feb., 1964. — *Editor.*

Antennas and Transmatches

Some Frequently-Asked Questions and the Answers

BY LEWIS G. McCOY,* W1ICP

A RECENT article on a transmatch [1] brought in a batch of mail with questions concerning the operation of transmatches with different types of antennas and feed lines. Many of the questions were types frequently asked by newcomers, and it was felt that more coverage should be given to the subject of using transmatches with different types of antennas and feed lines. Let's take the more-frequently-asked questions and see if they may apply to your setup.

"It always seems that publications state that a center-fed dipole and feeder combination must be a certain length, such as 135 feet for the dipole with 66-foot feeders. I cannot get up such an antenna or feeder length because I don't have the room. Will any other length or lengths work for me? I would like to work all the bands, 80 through 10; so what should I do?"

First, the reason that publications give specified antenna/feeder lengths is to show the builder what type of tuning, series or parallel, would be used at the transmatch. However, if you don't mind spending a little more time making your initial transmatch adjustments when your antenna system is installed, it isn't really important *what* the antenna/feeder length is, as long as certain requirements are met. The simplest way to make a multiband antenna is to first find how long you can make it. This, of course, depends on where you can support the ends. In any case, let's suppose that one end of the antenna can be tied to the house and the other end to a tree at the back of the lot. Measure a wire long enough to reach between the two points, put an insulator on each end and cut the wire into two equal lengths and put an insulator in the center. Connect a feed line to the center and make the line long enough to reach the transmatch in the station.

Several points bear mentioning here. First, always make the antenna as long as possible. If the antenna is at least ¼ wavelength long at the lowest operating frequency, for example, 60 feet at 80 meters, it will do a fairly good job. Second, always get your antenna as high as possible above the ground. Third, the feed line must be a low-loss type for multiband operation with this type of antenna. The line can be open-wire feeders; either homemade or the commercial TV type will be excellent. Another low-loss type of line is a good grade of the 300-ohm Twin-Lead used for TV installations. The only trouble with Twin-Lead is that when it gets wet you may have to readjust your transmatch. Coaxial feed line should not be used with this type of system because coax is not a low-loss line when compared with the types mentioned above. Also, coax should be matched, or at least operated with as low a standing-wave ratio as possible, usually no more than 3 to 1. (See next question.)

Basically, what we are saying in answer to the question is that we make the antenna fit the location and don't worry about exact lengths. With a transmatch of the type described in the recent issue of *QST*,[1] you shouldn't have any problems making the system work on all bands.

"I have an 80-meter dipole, fed with coaxial cable. Can I use this antenna on other bands by installing a transmatch?"

The answer is no. We could qualify this and say yes, but one could run into serious losses, or danger of burning out the coax, plus the possibility of not being able to load the amplifier in the transmitter.

Let's suppose we are using 75-ohm coax to feed the 80-meter dipole. On 80 meters, the impedance of the antenna is somewhere near 70 ohms, offering a good match for the coax and a low s.w.r. However, when this antenna is used on 40 meters, the impedance is very high, something on the order of 4000 ohms. This would mean an s.w.r. of about 60 to 1 in the coax, resulting in very high losses in the system. For example, if the feed line were RG-59/U and100 feet long, the loss would be about 10 decibels. Converting this to power, if 100 watts were coming out of the transmitter, only 10 watts would reach the antenna! The rest of the power would be consumed as heat in the coax line.

There is one case where a coax-fed dipole can be used on more than one band, and this is of particular interest to the Novice. A 40-meter coax-fed dipole will work on 15 meters and have a fairly low s.w.r. on both bands.

There are two reasons for using a transmatch with coax-fed antennas. First, there isn't enough low-frequency harmonic attenuation in the amplifier stage of the average transmitter to prevent transmitting a second harmonic of sufficient strength to cause interference to other services and thereby get into trouble with the FCC. A transmatch will provide harmonic attenuation.

* Technical Assistant, *QST*.

[1] McCoy, "A Completely Flexible Transmatch for One Watt to 1000," *QST*, June, 1964.

Second, many transmitters these days are designed to work into a 50-ohm load and won't work at maximum efficiency if the load is much different from 50 ohms. A good example would be a coax-fed dipole on 80 meters. The antenna system would provide a 50-ohm load over a very narrow portion of the band, but if you wanted to QSY from one end of the band to the other you wouldn't be able to make the transmitter amplifier load. A transmatch in the line would make it possible for the transmitter to always "see" a 50-ohm load, regardless of what portion of the band is used.

"*I am using 450-ohm open-wire line to feed a dipole ½-wavelength long on 80 meters. I know the impedance of the dipole is about 70 ohms, which would mean an s.w.r. of about 7 to 1, but the s.w.r. bridge between my transmatch and rig shows an s.w.r. of 1 to 1. How come?*"

This is a very frequently-asked question and, understandably, can be confusing when you don't know what is going on in your antenna system. Fig. 1 shows such a system.

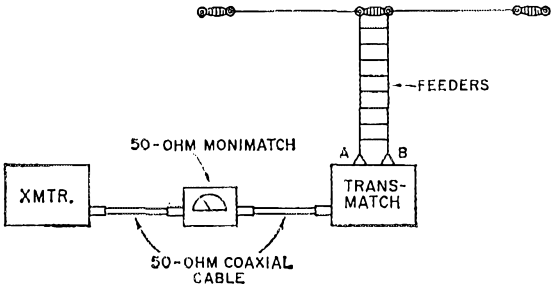


Fig. 1—This is a drawing showing a typical antenna system fed with open-wire line and using a transmatch.

A transmatch is simply an adjustable r.f. transformer. It can be a step-up or step-down device, depending on how it is adjusted. The Monimatch is inserted in the coax line between the transmatch and transmitter and should always be the same impedance as the line it is in. In our illustration, we have a 50-ohm Monimatch inserted in a 50-ohm line. On the output side of the transmatch we have the feeders of the antenna system. These feeders present an unknown load across terminals *A* and *B*. We don't know what this load is, and strange as it sounds, we don't care. There is no simple way of predicting what the load would be because we would have to know the exact impedance of the antenna, the characteristic impedance of the line, and the electrical length (*exactly*) of the line at the operating frequency before the load impedance could be calculated. We have only one object in life at this point, and that is to get the amplifier of the transmitter to load, and to do so efficiently. As mentioned in one of the earlier answers, the feed line is a low-loss type, so even if we have a high s.w.r. on the line it wouldn't make any significant difference; the *line is low loss*.

So, as we stated, our problem is simply one of making the amplifier take a load. All we need do is feed enough power through the bridge to get a forward reading on the s.w.r. indicator and then switch the unit to read reflected power. We then adjust the transmatch so that there is zero reflected reading *vs.* full scale forward. Once this condition, or one as close as possible to it, is obtained the transmatch is correctly adjusted for the best transfer of power between the transmitter and antenna system. When you have a reading of zero reflected, you then have an s.w.r. of 1 to 1 on the *coax line* between the two units. You haven't changed the load connected across terminals *A* and *B* on the transmatch and you haven't changed the s.w.r. on the open-wire line. What you have done is to correctly adjust the transmatch so that your transmitter "sees" a 50-ohm load. If it makes you happy, you can tell everybody you have an s.w.r. of 1 to 1. But remember, the 1 to 1 is only on the coax line between the two units. Doing a little thinking about the above statements should show you the beauty in using a transmatch. If you want, you can always have a 50-ohm load for your rig, exactly what it was designed for.

"*What are the advantages or disadvantages in using a multiband trap dipole* vs. *an ordinary dipole, center-fed with open-wire feeders and a transmatch?*"

First, let's specify exactly which two types of antennas we are comparing. For our trap dipole let's use the one described in *The ARRL Antenna Book*.[2] This is an 80-through-10-meter trap dipole using two traps, one in each side of the antenna. The feed line can be either 50- or 75-ohm coaxial cable.

For the ordinary dipole let's assume an 80-meter half wave, fed with open-wire line and a transmatch.

The one big advantage in using a trap dipole is the coax feed line. You can bury coax, run it alongside metal rain gutters, ground the outer shield, snake it in through metalwork, *all* these things *without* having any appreciable effect on the r.f. carried in the line. Another advantage in using this type of antenna is that it will show a fairly good match for the coax over a narrow portion of the 80- and 40-meter bands. More on this in a moment. A third advantage is that no transmatch is required with this system for many types of transmitters. A transmatch does require adjusting, and this problem is one not encountered with the trap antenna. Now let's look at the debit side.

An oft-stated advantage in using a trap dipole is that it will present, more or less, a constant 50- to 70-ohm load on all frequencies in all the bands the antenna is designed for. However, close inspection of such a system shows this isn't true. We spent several days making careful s.w.r. checks on the trap dipole and found several interesting things about the match. Fig. 2 shows the s.w.r. curves of a trap

[2] *The ARRL Antenna Book*, Chapter 6, Figs. 6-15 and 6-16.

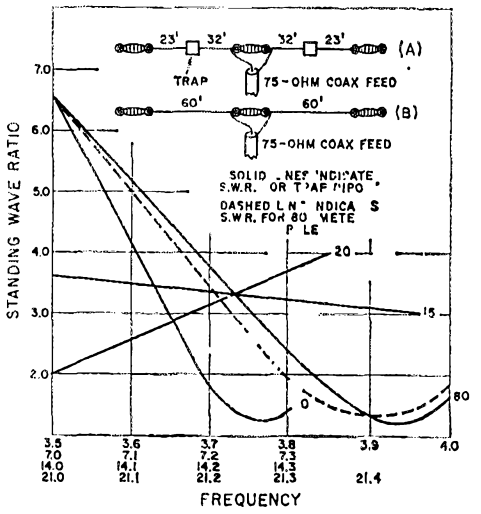


Fig. 2—This graph shows the standing-wave ratio for the 80- through 15-meter bands, using the trap dipole shown at A. Solid lines are used to show the curves for this antenna. For comparison, the dashed line shows the s.w.r curve for the antenna at B, a coax-fed 80-meter dipole. Both antennas were fed with RG-59/U, 75-ohm coax. The trap antenna was also checked on 10 meters, but in no case was the s.w.r. less than 5 to 1. These antennas, and the ones in Fig. 3, were approximately 40 feet above the ground.

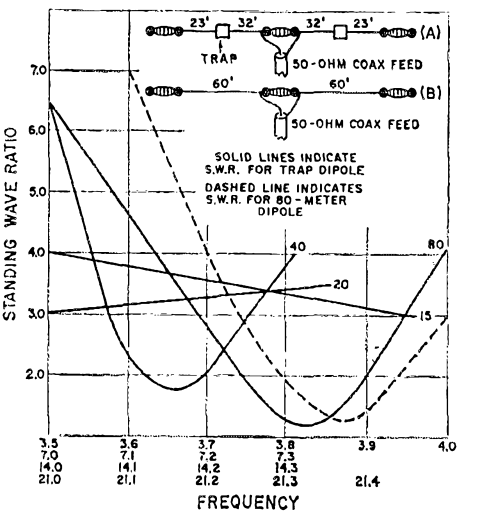


Fig. 3—This graph is similar to Fig. 2 except that the feed line used was 5-ohm coax, RG-58/U. The 10-meter check showed an s.w.r. of over 50 to 1 on all frequencies, similar to Fig. 2.

dipole fed with 75-ohm coax, and Fig. 3 the same antenna using 50-ohm feed. For comparison, we also show a plain 80-meter dipole. On 80, from 3850 kc. to 4000 kc., the match was 2 to 1 or less. However, on the low end of the band the s.w.r. climbed to over 6 to 1. On 40, the match was less than 2 to 1 from 7200 kc. to 7300 kc., and over 6 to 1 at the low end. On the higher bands, the s.w.r. was over 3 to 1 on all frequencies. In fact, on 10 meters the s.w.r. was over 5 to 1 and we were using 60 feet of line to feed the antenna. This mismatch, plus the natural line losses when matched, meant that over 50 per cent of the power was lost in the line. In other words, if you had 100 watts output from the transmitter only 50 watts would reach the antenna and be radiated.

Many of the commercial rigs that are on the market and being used by hams are designed to work into a 50-ohm load only. When we say "only" we mean just that. There is no provision in the coupling or loading circuit of the amplifier stage to adjust for any reactance present in the load. Simply, it means that if you have such a rig, you must operate into a 50-ohm load or the transmitter isn't working at full efficiency, or you'll find it impossible to "load."

Obviously, our trap dipole could only be used over a narrow band of frequencies with such a rig. As we mentioned earlier, if you are interested in operating over a narrow portion of 80 and 40, the system would work with such a transmitter.

Another disadvantage in using a trap antenna with direct coax feed to the rig is the lack of harmonic attenuation. We're not talking about TVI harmonics but the low-frequency type. The average transmitter doesn't have enough second harmonic attenuation in the tank circuit to prevent the harmonic from reaching the antenna and being radiated, thereby risking the danger of an FCC citation. The only way to prevent such radiation is by adding a selective circuit, a transmatch or filter, between the transmitter output and the antenna.

Last, the trap dipole is a "heavy" antenna. The weight of the traps and the coax line make it difficult to get the antenna stretched out straight. When it is stretched straight, the weight is such that unless a copper-clad steel wire is used for the antenna, the antenna would gradually lengthen, thereby changing its resonance.

Now let's look at our ordinary dipole fed with open-wire line. One disadvantage is that we must use a transmatch. The transmatch requires adjustment when changing bands and sometimes when changing frequency within a band. To a degree, the open-wire line could be considered a disadvantage because it should be kept clear of metal, such as gutters. Also, it could pose a slight problem bringing the line into the shack. However, as we see it, these are the only disadvantages in this system.

On the credit side we have a low-loss transmission line and a mismatch between the feeders and antenna is of no importance. We don't need to worry about a high s.w.r. simply because the line is, for all practical purposes, lossless. The transmitter always is working into a 50- or 70-ohm load simply because we can adjust the transmatch so that we have such a load. In addition, the transmatch will provide all the additional harmonic attenuation that we need to

keep from having undesired "QSLs." Also, as pointed out in an earlier question, the antenna *doesn't have* to be a full half wave long in order to work. It can be much shorter and still do a very good job.

While not entirely pertinent to the question, there is one point about open-wire line worth mentioning. Some amateurs say they don't like to use open-wire feeders because it is difficult to bring the line inside the building to the shack. This may come as a surprise, but you don't have to bring the line inside the building. The line can be terminated outside the building, and at that point you can connect a good grade of 300-ohm twin line to the open-wire terminals and bring the twin line into the shack. The question that pops up here is what happens when 300-ohm line is connected to open-wire line of, say 450- or 600-ohm impedance. Nothing happens as far as losses are concerned. Both types are low-loss line and any discontinuity or mismatch are taken care of by the transmatch. As we stated earlier, we don't know or care what the load is across terminals A and B in Fig. 1, as long as we have low-loss feeders. The transmatch can be adjusted so that the transmitter sees a 50-ohm load.

"How much loss does a transmatch add to the antenna system?"

A good question. Naturally, any circuits inserted between the transmitter and antenna are going to add some losses.

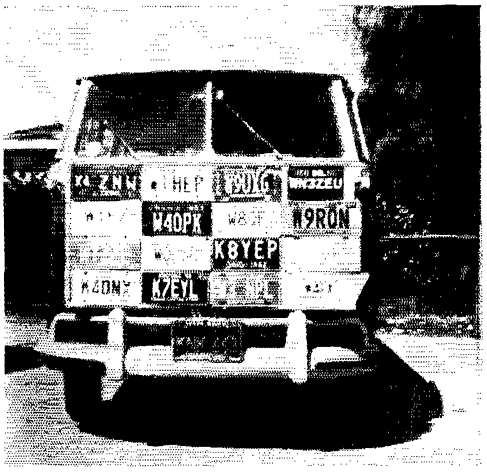
A few years back we made some checks on transmatches, and the insertion loss amounted to only a few per cent with optimum adjustment. The actual loss in any given case will depend on the value of load that must be matched, and the way in which the transmatch is adjusted to bring about the match. Losses may be appreciable if the circuit is adjusted so that the r.f. current circulating in the transmatch tank is large. In other words, the transmatch should be adjusted so that the operating *Q* is low. The optimum adjustment is the one that just matches with the coupling as tight as possible. This has been covered in practically every article describing the construction and use of transmatches or matching circuits. The small loss is insignificant when considering the advantages in using a transmatch.

In answering these questions we may have left the impression that coax line is not a good one to use in your station. This is not true. Coax is an excellent line for many purposes. Whether or not you choose coax should depend a great deal on your operating habits. For example, if you plan to spend all your time in a narrow segment of the 80-meter band, then a coax-fed dipole would be a simple but thoroughly efficient system. On the other hand, if you plan to operate v.h.f. and have any appreciable feedline length to the antenna, coax would be a poor choice of line because the losses would be so high.

In deciding on your own particular installation it would be wise to spend some time studying the transmission-line chapter of *The ARRL Antenna Book*. All the necessary information for the more popular types of feed lines used by amateurs are given in the book. One thing to keep in mind. Simply because your transmitter has a coax fitting on the back doesn't mean that you have to use coax all the way to the antenna. QST

Strays

G3NGF, secretary of the World Association of Methodist Radio Amateurs and Clubs, has a new address — 1 North St., Crewe, Cheshire, England.



Check "YL News & Views" this month for info on the first annual QSO party of the MINOWs (YLs in Montana, Idaho, Nevada, Oregon, and Washington).

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The International Amateur Astronautical Federation is looking for ham help. Volunteers write IAAF President Jack Spigarelli, 261 No. Second East, Price, Utah, for information about their instrumentation, telemetry, test, and communications experiments.

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Roy A. Carson (P.O. Box 61, San Diego, Calif. 92112) although not yet a ham, has a number of fine ham friends and collects ham license plates. The photo above shows how he has his VW bus bedecked. He has a collection of some 23,000 expired license plates from all over the world, and ham plates from many of the states. He'd like to hear from anyone who will contribute expired plates to his collection.

ARRL DX COMPETITION

1964 Results

COMPILED BY ELLEN WHITE,* W1YYM

Motivation

The captivation of the chase — the stacking up of yourself and your equipment against another station a mile away within your own section, or in your own country — the improvement of your operating techniques — the reliability of your antennas — all these make up the stimuli for the contest-minded amateur. A maximum effort within a relatively short period of time personifies this uniquely motivated individual, the contester.

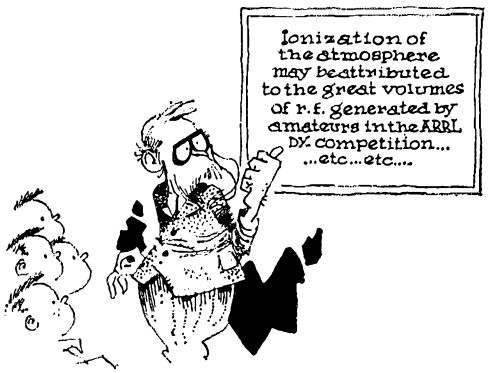
WHETHER it be the All-Asian affair pitting Asians against the rest of the world, the WAE affair with EU stations the protagonist or the ARRL International DX Competition, each and every DX-type contest has a special type of appeal setting it apart from all other competitive events. In 1964 the second and fourth week ends of February and March were the times, the DX bands the place and DXers comprised the cast for the 30th ARRL International DX Competition. DXers the world over turned out and found unexpectedly superb conditions. A total of 1474 logs were received from 116 different countries, 930 W/VE and 544 non-W/VE entries. In the pages to follow a number of new charts will break down many of the big single and multi-operator scores indicating the reasons for the large scores — versatility on *all* the h.f. bands — and spotlighting the single-band specialists and what they accomplished through a concerted effort on one band.

Regardless of scoring systems used, any equitable scoring arrangement pits stations in similar geographic regions, facing similar propagation conditions, against each other. While the "top" scores are always of general interest, certificate awards are based on competitions within a section or country. A total of 294 awards are due for mid-October mailing, attesting to achievements attained in the 30th ARRL Competition.

* Assistant Communications Mgr., ARRL.

The Clubs

Thirty-two clubs submitted sufficient entries (3) to qualify for the box listing. Significant is the almost million-point higher score of the Frankford Radio club with an all-out club effort to acquire *another* cocobolo gavel. PVRC with a fine "place" showing (and almost two million points higher than the previous year) averaged over 280-K points per member. Third-place NCDXC turned out well on both modes with W6KG and K6OHJ taking club awards. Among the top scoring clubs, a significant position change was shown by the Virginia Century Club going from 5th to 4th and almost 2 and a half million points. Praiseworthy, too, is the effort by the Ohio Valley crew breaking the million mark. Club awards are scheduled for mid-October mailing.



1965 ARRL DX COMPETITION

Phone: February 13-14, March 13-14

C.W.: February 27-28, March 27-28

From left to right, across both pages, a WAC-full of c.w. country toppers: Africa, ZS7M; Asia, JA1BRK; Europe, HA1KSA (ex-HA7P, HA1KK); S. A., YV1DP; N. A., PJ2AE and Oceania K6SDR at KG6AAY.

Soapbox

"Got countries 213 and 214 on 40, but no new ones for *DXCC*." — *W3MFW*. . . . "15 went wild on Sunday afternoon the 2nd week end. Within less than an hour QSO'd VK ZL KG6 ZK1 9G1 JA and a VP8." — *K3MNJ*, opr. *K3KPV/3*. . . . "Congratulations to FP8CB/FO8 for some f.b. operating!" — *K3LJZ*. . . . "The propagation experts have their slide rules reversed — lower sunspot numbers result in better conditions judging from scores I've heard." — *W3WPG*. . . . "Conditions on 20 were great!" — *W3PZW*. . . . "W3FYS just missed getting 100 countries on 15." — *W3MSK*. . . . "On 40 and 80 please please ask the DX to send the call of the station being worked at the **end** of transmission." — *K2DCA*. . . . "I am especially grateful to my father, W2SDB, who encouraged and taught me the real meaning of patience." — *WB2GPH*. . . . "It sure is a lot of work with dipoles. Last year I topped 361-K as K1RTB." — *WB2MFX*. . . . "Real happy to hear ZK1AR come back on 80, followed by KX6BU." — *W9WIO*. . . . "SM5DIC/9Q5 deserves an award for the 'longest call in the contest'." — *W9QYW*. . . . "Minutes/QSO on 80-17.6, 40-8.4, 20-4.6, 15-4.4, 10-34." — *W8VSK*. . . . "Raised my 20-meter beam to 70' and noticed a big improvement over the 50' level." — *W8FGX*. . . . "For once it wasn't even necessary to climb the tower in the middle of the night." — *W8ZCQ*. . . . "A major frustration was my failure to work KG6AAY on 40. I tried three different antennas with usually pronounced directional effects but his signal didn't change in the slightest. I could only conclude that his signal was arriving either straight down or straight up!" — *WA2OJD*. . . . "Who says 15 is dead? I worked almost as many countries on 21 Mc. as on 20!" — *WA2QMC*. . . . "Next year three finals!" — *W9FDL*. . . . "I believe the east coast DXers have some method whereby the reflectors on their beams prevent us from getting through." — *W9NFA*. . . . "I ran down 3 batteries in my keyer." — *K1VSK*. . . . "I thoroughly enjoy participating in this classic." — *KL7CYS*. . . . "I hope the flu epidemic comes at a different time next year." — *W7MX*. . . . "Still troubles with DX who won't work me thinking I won't count and W's who insist on calling me thinking I will count!" — *KH6FIF*. . . . "Haven't heard such signals from Europe on 15 since '59." — *W7WJB*, opr. *K6ERV*. . . . "My first contest and I surely underestimated the amount of work required and the fierceness of the competition!" — *W6RGG/6*. . . . "Worked three VS1's in a row on 20." — *WA6VAT*. . . . "There should be a multiplier based inversely on the power leak noise level." — *W6ERS*. . . . "Frequently calling simultaneously or in succession were W4SHX W4SHJ and W4HSJ. This seemed to confound some of the DX operators." — *W4SHJ*. . . . "40 was great the 2nd week end with stations from EU coming through with unbelievable strengths. See you next year from North Texas." — *K6LSG*, opr. *KØMIC*. . . . "A wonderful test, as always." — *W6IBD*. . . . "Our gang operated the first week end only." — *W6RW*. . . . "We had an 11-hour opening to EU on 3/29." — *W6EPZ*. . . . "The Gods were against me. A week before the test my beam came down in the wind, my receiver quit on me and the relays wouldn't close. I dropped my bug on the floor and broke it and my break-in system stopped breaking-in." — *WA6RUS*. . . . "Biggest surprise, 14 countries on 10 with a Ranger, barefoot." — *K5ABV*, opr. *K5HRR*. . . . "Worked 22 new ones bringing my total to 119 in 4 months up here." — *K5YAA/VO1*. . . . "I wasn't going to enter a log but it occurs to me that the boys who sweat for the top spots need some of us privates and corporals to make up the ranks for them to command, hi!" — *VE3AU*. . . .

Minimum Number of Countries	30	50	80	60	10
Band	80	40	20	15	10
W1BIH		52	93	71	
W1BPW	30		94		
W1BU*	56	85	110	71	
W1EVT		61			
W1JYH	30	51	80		
K1LPL				60	
K1NOL		84	100		
W1WLZ	48				
W1WPO			103		
WB2APG*	34	75	85	67	
W2AYJ		76	83	64	11
K2DCA			91	74	10
W2GGE		61	84		
K2HWL			124		
WA2IZS					10
K2LAF			89		
WA2OJD		54			
W2VJN	30	54	80		
W2WZ		55	94		
W2ZWW			92		
W3ADQ*	32		96	62	
W3AFM			110		
W3BES	33	77	88	70	12
W3EKN		51			
W3GHM*	33	69	93	72	
W3GRF	45	84	105	73	13
W3GRS*	32	55	85	69	
W3HHA		51			
W3HHK				60	
W3IYE		57	81		
W3KFQ*		62		60	
K3KPV/3		51			
W3KT/3		55			
W3MCG		64	85		
W3MFW	31	80	87	65	
W3MSK*	57	100	131	99	13
W3MVB		50			
W3MWC*		65		60	
W3PZW	37	52	133		
W3TMZ*	39	77	95	75	10
W3VKD*	39		98	84	14
W3WJD*	53	87	97	83	
W3WPG*	44	70	82		
W4BVV*	38	64	85	68	
W4BCV		65	92		
W4DHZ/4	35	76	89	71	15
W4DXI					10
K4GSU		65			

Minimum Number of Countries	30	50	80	60	10
Band	80	40	20	15	10
W4JAT		51			
W4JDR	31	61	83	63	13
W4KFC	40	80	111	76	
W4KXV*	52	74	122	72	10
K4LIQ*	44	78	104	83	
W4LSG		55			12
W4MCM		52	93	64	
W4SHJ	31				
W5BRR			81		10
WA5CBL		50			
W5CKY		64	80		
K5HRR		59			14
W5WZQ		72	91		
K6AHV		61			
W6DFY*		55			
W6EPZ		72	93		
K6ERV			90		
W6GRX		52			
W6IBD		57			
W6KG		57	81		
W6LCX			95		
W6MSM			87		
WA6QGW					11
W6RW*	30	68	101		
WA6SBO			101		
W6VSS*	49	111	134	74	17
W6WX		50	84		11
KH6FIF					10
W7PGS		56			
W8FGX	42	80	109	72	10
W8JSU			106		
K8LEE		60			
W8SH*		59			
W8VSK		95	94	70	
K8WVF		76			
W8ZCQ			86		
W8ZJM		55	80	66	
W9ERU		71	90	65	
W9GIL			81		
W9IOP		63	90	70	
W9IRH			80		
W9QYW			81		
WØAIH			80		
KØMIC		53	80		
WØNFA*		63	90		
WØYTQ*			91		
VE2NV	36				

* Multi-operator Station

DX Continental Champions

Single Operator

C. W.		Phone	
CN8FW..246,240	*Africa*	606BW....92,394
JA1BRK..237,384	*Asia*	JA1BRK..26,535
G4CP....327,113	*Europe*	DL1KB..140,940
HP1IE...547,108	*No. America*	KP4AOO..343,557
KG6AAY.324,608	*Oceania*	KX6BU..104,370
YV1DP..192,048	*So. America*	YV5BIG..381,150

"Nothing the matter with this 'quiet year' for excellent and surprising openings, considering." — *VE2NV*. . . . "Finally worked KJ6." — *VE5PM*. . . . "CU next year with 2 elements on 40." — *VE6TP*. . . . "Excitement and participation on 20 were terrific." — *VE7VC*. . . . "I hate to think what the phone QRM will be when conditions improve." — *W3PN*. . . . "Greater love hath no man who enters this rat race with a transceiver and dipoles for dear old FRC." — *W3ECR*. . . . "New QTH, new antennas, good phone conditions, a thoughtful wife, the best second op. in the states (K3JJG) and lots of good luck made this the best year yet on phone. — *W3HJD*. . . . "Been hunting an Asian on 80 for 3 years and ended up getting one on s.s.b., 4X4DK." — *W3MWC*. . . . "Ten was surprising March 14 and 15." — *W3ZVJ*. . . . "Our 50-meter phone totals include 134 *DL*, 82 G, 46 *I* and 22 *F*. On 15 we worked 34 *I*, 33 *G*, 29 *DL* and 20 *PY*." — *W3MSK*. . . . "Someone at ARRL (probably W1WPO) must have a ouija board. The phone week end of March 14-15 was the best I've ever seen." — *W9GAI*. . . . "Great 15-meter phone opening March 15. Sunspots where is thy sting?" — *W5AJY*. . . . "Running barefoot I got my toes stepped on many times but it was worth it." — *W4AAWG*. . . . "I find that one larynx just isn't enough." — *K8WVF*. . . . "It's almost impossible to do well on 10 and 75 phone without directive antennas." — *W2WZ*. . . . "At my age I'm happy just to be in the contest." — *W2JB*. . . . "My greatest thrill in *any* DX contest so far was working FB8WW on 20 a.m., with the whole USA calling. Just proves that it's all in the antenna." — *W2VCZ*, opr. *K2HLB*. . . . "If phone conditions the second week end were typical of a sunspot minimum, we should have more of them." — *W10KG*. . . . "After over 25 years, I have a good rig, good rcvr. and beam and then I have to work 3 out of the 4 phone test days." — *W1MRQ*. . . . "Fabulous 15-meter EU opening the last Sunday of the phone test. 10 open to Central and SA at mid-day. It seems as the sunspots go down my scores have been going up and the competition gets rougher and rougher. Sometimes I just don't understand and other times I'm confused." — *K6OHJ*. . . . "My biggest thrill was working JA1BRK on 10 phone for my first JA there in 2½ years." — *K6ERV*. . . . "My top phone score and conditions are supposedly getting worse." — *W4BVV*. . . . "Worked Israel on 40 and 75." — *W4HKJ*. . . . 'It was a wonderful phone contest this year." — *W6LCX*. . . . "The phone DX participation was marvelous." — *WA4MFS/VO1*. . . . "I wish I had kept count of the DX stations I lost in the QRM caused by W's calling CQ DX." — *K5ICK/VO1*. . . . "Found Africa well represented on phone." — *VE2UX/3*. . . . "Phone conditions were terrible up in B. C." — *VE7BHW*.

AFRICA

Continental leader CN8FW (K4EZL) wound up with 1710 c.w. two-ways on 7-14-21 Mc. Doug wonders what happened to Utah, North Dakota and Nevada? YL CR7LU found 10 meters absolutely dead. CR7IZ bemoans an ancient receiver but finds a new one quite impossible with a 43% customs fee! ST2AR put in a good "show" the first week-end but local problems caused his station to be confiscated in early March. Eric has enjoyed 11 years of contesting from the Sudan. ZD3A caused more than a flutter on 80-40-20 and 15 meters and found the test exciting. Lighthouse keeper ZS3EW says he never heard the bands in such poor condition the 2nd week end. ZS7M agreed, finding conditions very poor to W/VE in March. 606BW (K1JLD) missed the first half. Bee feels he's learned a lot from operating on the *other* side of the pond. 9L1TL has a guardian angel! At 2400 GMT at the very end of the March week end his TX blew a filter condenser and it took 5 days to replace it! 9Q5AB (DL7AH) delivered his logs in person with loud exclamations of praise for the operating know-how of the W/VE contingent.

VQ2WR reports getting South Dakota on phone after waiting 5 years for just that one state. 5H3JR didn't hear a single VE1, VE4, VE5 or KL7. He reports American operators the "most" in politeness, patience and proficiency. Due to flat-topping he found many otherwise potent sideband signals very difficult to copy. 5X5JG says this was his very first contest and great fun. 9L1HX reports generally good phone conditions *and* his first KH6 worked during the second week end.

ASIA

G2RO/EP spent 5 hours on 20 meters and raised 6 happy W's for an Iran multiplier. The balance of his operation was spent in amassing a healthy total from G2RO. JA1BRK topped Asian c.w. reports with 237-K using a quad on 20-15-10 and a vertical for 80 and 40. KA2LD picked up 7 new states during the test. Multi-op. KA2KS (K4OKZ, W8YVN, K9IHG and W4OXQ) managed to give K4OKZ's dad (W4KFC) a good run for his money with their V-beam over a rice paddy. KR6BQ tried hard though unsuccessfully to get through on 160. Jerry feels ten would have been good if activity picked up. He reports KH6FIF very loud when they moved up there and the only W/VE heard although he kept a spare receiver on ten throughout the test. Lebanon Ambassador OD5AX found the test enjoyable and in scanning through his log we find just four reports over S-7; Hank gave an S-8 to W3PZW, W4KFC K4LIQ and W4SHW. VS1LP lists highlights of this year's tests: Working W1BB for their first 160 meter QSO, working W4KFC on 80 for his first east coast contact on that band, working W9s ADN and HUZ for his first W9's on 80 and working W5WZQ for his first W5 on 80. Bob also reports his first 5-band QSO with KH6FIF from 10 through 80. VS6FF (G3MZV) found 14 new states and hopes for a beam in the '65 competition. 9K2AN stirred things up some with a 7-hour stint in Kuwait.

BV1USG (operated by WA5FCZ) found phone conditions very poor with only one new state, Nevada. JA1BRK, high scoring Asian phone (as well as c.w.) operated the secon l week end only, averaging about 34 QSOs/hour.

EUROPE

High-lighting DL7AA's five-band operation was a go on 160 for three multipliers and 5 QSO's. His report illustrates band-changing through use of different colored inks.

W9ERU has demonstrated c.w. know-how umpteen times in DX affairs. Gene topped 406-K with 558 QSOs and a multiplier of 249. Radiators include an 80-meter phased array of three 60' towers in an equilateral triangle 66' apart, three 500' long wires usable singly or in pairs 120' degrees apart and a fan dipole 50' high; a 60' steel tower with 20- and 40-meter beams on top, a 7 Mc. 2-element rotary 60' high, three 500' long wires usable singly or in pairs, a fan dipole; on 20 a three-element rotary up 60', three 500' long wires used singly; on 15, two elements of a combination five element 10/15 rotary 50'high, also three 500' long wires used in pairs; 10-three elements up 50'. WOW!

QST for

f.b. Rudy. In his 2nd ARRL test, DL6VP was very pleased *to meet many new U.S./Canadian hams. F8VJ enjoyed* his 20th ARRL competition winding up with 1052 QSOs in just 46 hours. Top EU score by G4CP totals over 1800 QSOs, his highest number so far and close to the 2000-figure total Ron keeps trying for. G2QT says these long operating periods of the contest really show up the weak spots in home-built gear! The ubiquitous Bob Roberts, G2RO, affirms we've proved again that very short calls are enough so why don't we resolve to carry this over to normal operations? Tried again for Nevada says HB9JG and missed again. HB9KC reports his first W6-QSO on 40 (W6VSS). Conditions were poor the first week end (on 7 Mc.) and couldn't enter the 2nd part as I had to go up in the arctic to operate LI2C, says LA5HE. OH1SH reports on an enjoyable contest due to the operating calibre of the W/VE. SP6AAT worked his last state for WAS — Idaho.

Our first phone contest and watch our smoke next year says G3LDI. The fellows at GW3NWV pay tribute to the high standard of operating shown by all U.S. amateurs, without exception. 9A1AIJ (I1AIJ) in his first multi-operator phone go at San Marino says to pass the word around that he QSLs 100%.

NORTH AMERICA

KP4BJU found it interesting to work two KH6's on 80. Although most of the c.w. operators were fine there were some superlative ones says Randy, W9IOP and the gang at W3WPG and W3WJD, for instance. *Things would go* faster, too, if more of the boys would use break-in and higher speed. Look for him in '65, perhaps multiop with his dad, KP4DV. KZ5FC reports the strongest signals from the states from W6VSS and W3MSK. PJ2AE operated his last contest from Netherlands Antilles. Stan set a goal of 200-K and made it, with a fine 5-band endeavor. He reports fading prominent on 40 and 80 and heavy QRN during full moon periods. 6YAXG (now 6Y5XG) reports being deluged with QSLs after the first week end.

After entering his first phone contest, KZ5DG became a victim of that common disease which only more points and multipliers could cure. TI2EW worked 242 stations on ten meters but couldn't raise a single W7. He noted the following stations for tops in courtesy and efficiency: K3NHL, WØEZO, K2HLB, W6RW, W3MSK. VP7CC reports first week end problems with a burned-out power transformer causing operation with 2 crystals and a DX-60 *and* a sum of 600 phone two-ways that first period.

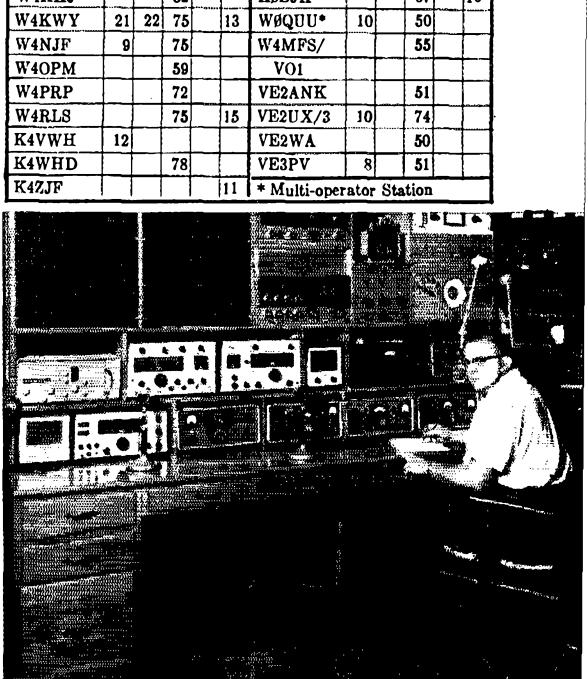
OCEANIA

KC6BK says 645 stations called him during the whole test and he only called two himself (VE8RX and W1WPO). KG6AAY operated by K6SDR turned in one of the niftiest c.w. logs, tops for Oceania c.w. — tops in legibility, too. KX6AJ reports the following: "Thinking that I was coasting into my 3rd uncontested high-KX6 award I did not push it too hard. When WA6HRS showed up to operate the club station (KX6BU) for the second week end I did not see any worry since I had such a big lead on him. So off I went on a skin-diving trip for part of the period while he hit it and I was taken like candy from a baby." In spite of execrable conditions VK5ZP found the test enjoyable and claims the best operators of the world are in this contest and it's a joy to work them. This is possibly the first claim for points from VK on 160 in an ARRL DX Test (W2KQT, W1BU). On the night of Feb. 23rd I heard a great many W's answering my calls on 1808 kc, but the noise level plus fading made it extremely difficult to copy, reports VK5KO. VR1B says conditions on forty were reminiscent of 20 in '59-'60 when short path used to be wide open to W.

Minimum Number of Countries	5	20	50	50	10
Band	75	40	20	15	10
W1AWE			59		
W1BIH			61		
W1FZ				53	
W1GKJ			58		
K1IMP			58		
W1JYH			51		
W2DAJ					12
K2HLB	13	35	104	54	11
WA2IEK	5				
WA2IZS	6		52		
K2JMY			55		
W2PUN			57		
W2QWS			69		
W2VJN			51		
W2WZ	10		74		
W3ADO	12	23	52		
W3ALB	7		51		
W3BES	12	28	65	50	13
W3CGS			51		
W3EQA					11
W3GHM*	12		59		13
W3GRS*	10			50	10
W3HA			53		
W3HHK					11
W3IYE	8		56		
W3ITC			58		
W3KFQ*			58		
W3KT/3	5		62		
W3MSK*	27	39	108	78	19
W3MVB	5				
W3MWC*	5	24	57		
K3NHL	10	21			11
W3OCU			52		
W3WJD*	19	30	69	67	12
W3ZVJ			50		
WA4AWG					11
W4BCV	8	23	74	51	13
W4BVV	18	34	84		10
WA4CGA					11
W4HKJ			52		
W4KWY	21	22	75		13
W4NJF	9		75		
W4OPM			59		
W4PRP			72		
W4RLS			75		15
K4VWH	12				
K4WHD			78		
K4ZJF					11

Minimum Number of Countries	5	20	50	50	10
Band	75	40	20	15	10
W5AJY	12		51		10
WA5ALB	6				14
WA5CBL					18
K5JZY	7				14
W5KC	6				
W5KTR		20		54	19
W5LCI			55		
W5LEF					13
W5LLB/4	5				12
K5MDX	16	28	54		
K6AHV	9	27			17
WB6BBT					12
K6ERV			50		11
WA6GFY					19
W6GRX					13
W6LCF					12
W6LCX			50		10
W6LDA					12
K6OHJ			51		14
W6PKK					11
WA6QGW					15
W6RW	11		56		15
WA6SBG	14	27			16
WA6SBO			50		
W6WB					15
W6WX					17
KH6FBJ					12
K8AJK			69		
W8EGR			56		
W8GIO*			51		
W8NGO*			66		
W8NWO*	23		75	59	17
W8RXY			51		
W8UD			64		
W9GMY			58		
W9GIL					13
K9PNV	7		55		
W9WHM				51	
K9ZBI					10
KØBJK*			67		10
WØQUU*	10		50		
W4MFS/ VO1			55		
VE2ANK			51		
VE2UX/3	10		74		
VE2WA			50		
VE3PV	8		51		

* Multi-operator Station



W2VCZ operated this magnificent set-up at K2HLB for a superb phone single-operator performance. Bob put in 88 hours on 5 bands, working 107 *different* countries throughout. He claims the tremendous arrays at K2HLB (Ramsey, N. J.) make the difference: 6 over 6 on 10, 5 over 5 on 15, 6 over 6 on 20, 3 elements on 40 and a 2-element driven array on 80. See his countries per band totals elsewhere in this report.

Single-Operator DX, over 200-K

HP1IE	547,108	DL7AA	273,978
KP4AOO	509,976	VP7CC*	253,332
KP4BJU	437,400	CN8FW	246,240
YV1DP	492,048	GW3JI	245,616
YV5AGD	465,690	DL1KB	244,122
CE1AD	454,320	F8IH	237,840
YV5BIG*	381,150	JA1BRK	237,384
YV5AGD*	366,252	HB9JG	234,630
KP4CC	362,871	JA1VX	227,988
HK3RQ	357,345	9Q5AB	224,046
KP4AOO*	343,557	HK4EB*	222,525
VP9L	327,540	OK1ZL	220,365
G4CP	322,494	TI2EW*	209,049
KG6AAY	324,608	OZ3FL	205,128
TG9SC*	304,854	PJ2AE	200,256

* Phone

K9CVJ/K6G had trouble with W/VE stations not listening to his complete call. KC6BK reminds the W/VE phone group of the unique frequency allocations for KC6: the a.m. phone band on 20, 15 and 10 but only 7100-7150 and 3.8 to 3.9. WA6HRS operated the 2nd phone week end from KX6BU averaging a hefty 32 QSOs per hour. ZK1AR was clobbered by both visiting persons and visiting aircraft.

SOUTH AMERICA

HK7ZT topped the 1000-QSO figure with QSOs on 1.8-28 Mc. Tony joins in the chorus of admiration for the W's operating ability. W1UFW at the helm of KC4USB was amazed at the operating techniques and said it was obvious that just about everyone was LISTENING. His biggest thrill was working 60 QSO's/hour from 8000 miles away with antenna 12' above the snow surface. YV1DP's enormous total of 2100-plus two-ways included 145 exchanges on ten meters. A beautifully typed report and top c.w. score from South America. YV5AGD's tremendous 466-K figure included 29 QSOs in 12 areas on 160!

HK4EB's 1000-plus phone sum includes a vocal two-way on 160 with W6VSS. OA4PI reports working W4BCV again on 15 and 20 and succeeded in chiding him into sending a Kentucky confirmation. Jim reports he finally came through after one year and 4 contacts plus 3 QSLs and a letter! Whew! VP3HAG reports favorable though unstable conditions, with 75 open between 0300-0700 GMT and 40 opening periodically between 0600-1100 GMT. In his first phone contest (and top S.A. score!) YV5BIG picked up 5 out of 6 states needed for WAS. Raul feels everyday operation is a snap after working pileups 10 deep! YV5BPG picked up his last two for WAS, Del. and Mont. That tremendous phone multiop job by YV5AHG utilized the talents of YV5s AFH AKP AKU in addition to AHG.

Disqualifications

The following are deemed ineligible for score listing or awards. In each case disqualification under contest rule 14 was in view of non-observance of FCC rules as reported by at least two accredited Official Observers, or by a single FCC citation: *C.w.* — WA6YLW W8LT W9TKD VE2AYU; *Phone* — K4VFY WA0EMS.

Thirtieth ARRL

International DX Competition

Operator of the station first listed in each section and country is winner for that area. . . . The multiplier used by each station in determining score is given with the score — in the case of U.S.-Canada this is the total of the countries worked on each frequency-band used; in the case of non-W/K/KH6/KL7/VE/VO entries it is the total of the U.S.-Canadian districts worked on each band. . . . The total number of contacts is listed next. . . . The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 150 watts; B indicates over 150 watts, up to and including 500 watts; C indicates over 500 watts. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Examples of listings; W3BES. . . . 554,400-280-660-C-70, or final score 554,400; multiplier 280; 660 contacts; power over 500 watts; total operating time 70 hours. . . . Stations manned by more than one operator are grouped in order of score following single-operator listings in each section or country tabulation; calls or numbers of participants at multi-operator stations are listed in parentheses. . . . In sections or countries where three or more multiple-operator entries appear, the top-scoring station is being awarded a certificate.

C.W. SCORES

ATLANTIC DIVISION

Eastern Pennsylvania

W3BES	554,400-280-660-	C-70	
W3MFW	517,068-271-636-	C-82	
K3KPV/3	278,730-190-489-	C-75	
W3HHK	255,780-196-435-	C-51	
W3BIP	210,930-178-395-	C-53	
W3KT/3	195,324-164-397-	C- -	
W3CGS	177,288-166-356-	C-55	
W3OCU	164,008-166-335-	C- -	
W3EQA	157,945-155-341-	C-45	
W3GHS	109,752-136-269-	C-28	
W3EVW	104,058-123-282-	C- -	
W3PN	99,918-122-273-	B-32	
W3DBX	98,889-119-277-	B-45	
W3BYX	73,233-103-237-	B-65	
W3CAA	49,128- 92-178-	A- -	
W3INH	48,306- 97-166-	C-10	
W3ECR	45,936- 88-174-	A- 5	
W3HHA	34,128- 72-159-	C- -	
W3QLW	29,949- 67-149-	B-22	
K3HTZ	27,813- 73-127-	A-38	
W3STA	23,085- 57-135-	B-22	
W3TGF/3	21,228- 58-122-	C-60	
W3GHD	19,215- 61-105-	B- -	
W3CTJ	16,524- 54-102-	B- 7	
W3NM	14,014- 49- 96-	C-15	
K3CNN	13,296- 48- 93-	BC-18	
W3ORU	13,200- 50- 88-	C-20	
W3KDF	13,158- 51- 86-	C- 6	
K3NVC	12,816- 48- 89-	B-45	
K3MNT	12,540- 44- 95-	C-20	
K3ELF	11,484- 58- 66-	B-36	
W3NCW	11,280- 47- 80-	A-17	
K3MCO	7770- 37- 70-	A-14	
W3GSY	7137- 39- 61-	A- -	
W3CBF	6930- 35- 66-	A-40	
K3RFB	4704- 28- 56-	B-25	
W3DAO	4464- 31- 48-	A- -	
K3HNP	3978- 26- 51-	A- -	
W3AEM	2325- 25- 31-	B- 9	
W3JSA	2016- 21- 32-	A-15	

VS1LP on the left and top-band specialist W1BB on the right connected on 160 during the test, making it a thrilling highlight of this 30th ARRL DX Competition.

K3TRZ.....1200- 16- 25- A- 7
K3RHC[2].....450- 10- 15- C- -
K3LJZ.....300- 10- 10-AC- 1
K3LSX.....18- 2- 3- A- 3
W3WJD (K3JJG, W3WJD)
708,666-329-719- C-94
W3GHM (4 oprs.)
550,275-275-667- C-82
W3WPG (W3s SQX, WPG)
428,652-252-567- C-92
W3GRS (K3JCT, W3GRS)
428,250-250-571- C-90
W3MWC (K3LJZ, W3MWC)
338,130-221-510- C-83
W3KFQ (K3JGJ, W3KFQ)
271,830-205-442- C-60
K3JLI (K3JLI, W3YLJ)
192,780-170-378- C-88
W3QMZ (K2JXX, W3QMZ)
132,840-135-328- C-42
W3BGN (K3IPB, W3BGN)
119,196-132-301- B-96
K3OMP (K3s OMP YQJ)
5088- 32- 53- A- -
K3WNT (4 oprs.)
110- 5- 8- A-15

Maryland-D. C.

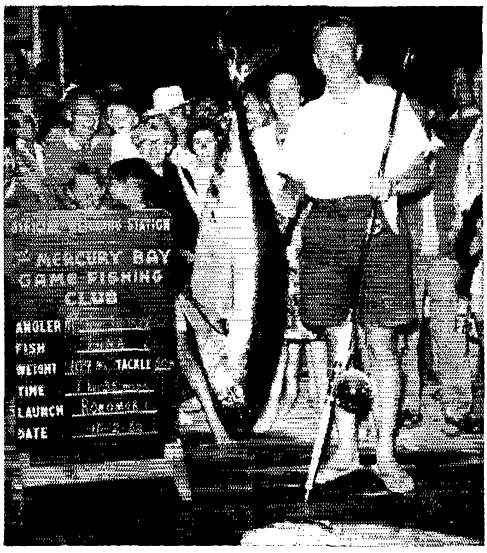
W3GRF...733,533-323-757-AC-80
W3PZW...511,038-267-638- C- -
W3MCG..287,205-205-467- C-50
W3MVB..253,449-189-447- C-60
W3MSR...215,424-176-408- C-76
W3ZVJ....195,216-166-409- C-65
W3EKN..141,816-152-317- C-47
W3QQL...141,414-147-322- B-51
W3ZQ.....130,287-137-317- C-50
W3AFM..100,980-110-306- C-40
W3RNY....96,876-117-276- C-50
W3BKE....17,442- 51-114- B-12
W3EPR....10,800- 48- 75- B-21
K3TJE.....7749- 41- 63- A-17
W3KA.....4872- 29- 56- B- 4
K3LLV.....3480- 29- 40- A- 6
W3IWS.....1751- 17- 35- C- 8
W3NJV.....663- 13- 17- A- 8
W3MSK (6 oprs.)
1,250,622-402-1037-AC-96
W3TMZ (W3TMZ, W9SZR)
630,480-296-710- C-93
W3ADO (6 oprs.)
397,324-237-568-AC- -

Delaware

W3IYE...285,690-214-445-AC-65
K3NHL...169,218-158-357- C-45
W3DRD..100,440-135-248- C-39

Southern New Jersey

K2DCA...459,330-251-610- C-74
WA2BLV.161,784-168-321- C-50
W2DAJ...133,575-137-325- C-47
W2QDY....85,020-109-260- B- -
K2CPR....81,432-116-234- B-23
W2SDB....50,196- 89-188- C-30
WB2GPH..44,604- 84-177- C-30
W2PAU....43,803- 93-157- C-30
WA2IEK..28,914- 79-122- C-33
K2OEA....23,314- 78-121- A-15
W2HDW...18,975- 55-115- A- 9
WB2FJF...16,758- 57- 98- B-29
W2TLO....13,158- 51- 90-AC-23
WA2QHQ..13,110- 46- 95- A-30
WB2EDH..12,690- 47- 90- A-23



ZL2AWJ (assisted by ZL2RA) was a good catch on c.w during the test for 1300 W/VE's.

Over 300 QSOs/band — DX

Band	80	40	20	15	10
CE1AD			987	887	
CN8FW		573	650	487	
DL1KB			501	484	
DL1KB[1]			666		
DL4EA[1]			340		
DL4OV[1,2]			1174	370	
DL5AO[1]			459		
DL7AA		344	625	447	
EA4GZ[1]			924		
F7GL[1]			396		
F8VJ			476	303	
G2DC				446	
G2QT			432	340	
G3KFX[1,2]			882		
G4CP			1020	423	
GI3OTV			644		
GW3NWV[1,2]			717	387	
HA1KSA		441	445	329	
HA5KBB[2]		433	601		
HB9JG			695	422	
HB9KC			316		
HK4EB[1]			304	444	
HK7ZT				368	
I1BAF[1,2]			396		
I1CWN[1]			793		
I1GO			305		
I1RB[1]			435		
I1ZIX			688		
JA1BRK		318	841		
JA1VX		379	880		
JA2DN			319		
KA2KS[2]			359		
KG6AAY		555	715	302	
KP4AXM[1,2]			576	539	
KP4AXM[2]			389	392	
KP4BJU		518	572	619	
KP4BMJ[2]		416	385		
KP4CC	302		546	630	
KX6AJ		458	323		
KZ5FC[2]			459	482	
LA1H			747		
LU6PK				436	
LX3AX			515		
OA4PD[1]			533		
OE5KE			540		
OH1SH			598		
OH2FS			792		
OH2QV[2]			691		
OZ1W			464		
OZ7G			303		
PAØLOU			638		
PJ2AE			363	356	
PJ3CD[1]			620		
PY1NEW			537		
SL5ZL			378		
SM3TW			371		
SM5BDQ[1]			437		
SM6CKV[2]			766	407	
SP6AAT			525		
TG9SC[1]			888	412	
TI2EW[1]				414	
UAØKFG[2]			306	765	
VK5ZP			544	418	
VP3HAG[1]				465	
VP7CC[1]				723	450
VP9BY[1]				380	
VP9L			772	936	
VS1LP				337	
YV1DP				1122	797
YV5AGD			520	411	549
YV5AGD[1]				503	
YV5BIG[1]				982	
YV5BTK				310	
YV5AHG[1,2]	348			2163	515	349
ZL2AWJ[2]			481	353	380	
ZP9AY				456	426	
4U1ITU[2]				470		
4U1ITU[1,2]				564		
5H3JR[1]				433		
6O6BW[1]				910		
9A1AIJ[1,2]				633	398	
9L1HX[1]				390		
9L1TL				372		
9Q5AB				688		

[1] Phone [2] Multioperator Station

WA2IZS....12,390- 59- 70- C- -
K2BG.....7410- 38- 65- B-18
W2QKJ.....6804- 36- 63- B-20
K2IEO.....2592- 24- 36- C- 8
W2FYS/2....2310- 22- 35- A- 9
WB2BGM...2016- 24- 28- C-20
WA2UOF[5]...1836- 18- 34- A-12
WA2WKB....624- 13- 16- A- 5
WA2TTA.....420- 10- 14- A- 7
WA2MES.....60- 4- 5- A- 1
WB2APG (WB2APG, W3DQG)
504,375-269-625-AC-90
WA2KWS (WA2s KWS OAA)
2583- 21- 41- A-18

Western New York

K2LAF....209,684-178-398- C-76
W2FVI....168,667-151-373- B-72
W2BJH....75,376-112-225- C-50
K2ZRO....67,800-100-226- C-45
WB2MFX...47,808- 83-192- B-55
WA2WGI...37,154- 76-163- B- -
WB2DGW..13,392- 48- 93- A-73
WA2NFY....4710- 30- 53- A-30
WA2KIZ.....3864- 28- 46- A-15
W2DGV.....966- 14- 23- B- 4
WB2CON.....216- 8- 9- A- 3
WA2SXE (WA2s SXE YFS)
25,650- 90- 95- C- -

Western Pennsylvania

W3LIV....32,232- 68-158- C- -
K3ZMH....14,400- 50- 96- A-24
W3KQD.....6510- 31- 70- A- -
K3ELL.....3174- 23- 46- B-16
K3VCH.....570- 10- 19- B- 4
W3VKD (6 oprs.)
633,360-280-756- C-80

CENTRAL DIVISION

Illinois

W9ERU....406,368-249-558- C-80
W9BUD....94,250-125-252- C-63
W9WFS....78,603-133-197- C-25
W9IRH....50,490- 85-198- C- -
W9WIO....49,662- 93-178- C-22
W9YYG....49,632- 94-176- C-23
K9MHW....26,978- 81-111- B-27
W9QM.....18,480- 56-110- C-32
W9CLH....11,664- 48- 81- A- -
W9QQN....11,520- 48- 80- C-28
WA9CYI....10,440- 45- 79- A-44
W9ZYD.....9102- 41- 74-AB- -
K9DWG.....2706- 22- 11- B-12
WA9EUC....1173- 17- 23- B-16
W9TCU.....1596- 19- 28- A-14
WA9ICQ.....1560- 20- 26- A- -
WA9CFI.....1071- 17- 21- A-16

K9IWS.....450- 10- 15- B- 7
W9BZW.....126- 6- 7- B- -
WA9EKJ.....48- 4- 4- A- 1
K9YRA.....27- 3- 3- A-10

K9CSW (K9s CSW YOE, W9MQZ)
113,742-142-267- C-38

Indiana

W9IOP....415,044-244-567- C- -
W9YB[4].....39,216- 76-172- B-69
K9LVK....21,417- 59-121-
ABC-34
W9LKI....18,126- 57-106- B-16
K9QAN[6]....5022- 27- 62- C- 7
WA9BWY.....27- 3- 3- A- 1

W3PZW scored the mostest on c.w. on 20 amongs the single-operator group, 133 *different* countries on that band alone.

Wisconsin

W9GIL....166,080-160-346- C- -
W9QYW....160,212-158-338- B-47
W9KXK....123,624-136-303- C-59
W9RH.....46,725- 89-175- C-49
W9WJH....32,400- 75-144- A-19
W9VZP....31,440- 80-131- C-15
W9SCZ....27,930- 70-133- A-36
K9KKU.....4410- 30- 49- C-20
W9GMV.....4200- 28- 50- B-26
K9OPF.....3456- 24- 48- A-10
W9HHX[6]....3302- 26- 43- C-10
W9HMU.....408- 8- 17- A- 5
W9YT (K9s ELT OPF)
42,960- 80-179- C-26

DAKOTA DIVISION

South Dakota

WØBLZ....13,065- 87-165- - -
WØCUC....32,058- 78-137-BC-33

Minnesota

WØAIH....63,648-102-208- C-18
WAØBWM..10,800- 40- 90- A-15
WØKUI.....297- 9- 11- B- 8
WAØEPG.....4- 1- 2- A- 6

DELTA DIVISION

Arkansas

WA5CBL..152,145-161-315- C-52
W5GFT.....2520- 21- 35- B-12

Louisiana

W5KC....139,992-152-307- C-55
W5BUK....79,692-116-229- C-70
K5DGI....11,952- 48- 83- C-15

Mississippi

W5CKY..201,852-189-356- -47

Tennessee

WA4CGA..56,472-104-182- B-61

GREAT LAKES DIVISION

Kentucky

W4BCV...369,072-233-528- C-72
K4GSU....27,300- 65-110- C-18
W4JBQ....24,321- 67-121- C-26
WA4HNC/4 (K4ZRA, WA4HNC)
12- 2- 2- A- 3

Michigan

W8VSK...541,766-269-672- C-76
W8SCU....65,190-106-205- C-29
W8VPC....61,020- 90-226- C- -
W8EW.....19,215- 85-193-AC-29
W8NGO....44,634- 86-173- B-30
W8DGP....34,602- 79-146- A-35
WA8CZH...31,464- 76-138- A-40
K8GRE....26,568- 72-123- C-33
W8MCC....8487- 41- 69- C-20
W8TRN.....4455- 33- 45- B-15
W8CSP.....2304- 24- 32- B-14
W8TJQ.....2040- 20- 34- A-18
WA8HGR....1782- 18- 33- A- 9
W8MSK.....960- 16- 21- A- 5
W8DM.....462- 11- 14- C- 2
WA8ECH.....27- 3- 3- A- 4
W8SH (5 oprs.)
300,675-211-475- C-87
W8DUS (4 oprs.)
122,640-146-280- C-35
W8CQN/8 (W8CQN, WA8HBS)
71,604-108-221- B-43
W8QFM (W8QFM, WA8CZH)
21,771- 59-123- C-40
WA8HDM (WA8s HDM HGR)
2825- 25- 39- A-31

Ohio

W8FGX...655,632-314-696- C-85
K8LEE...376,704-216-582- C-78
W8ZJM...293,700-220-445- C-57
W8ZCQ...125,280-145-288- C-58
W8CJN....97,152-128-253-AC- -
W8GQU....87,560-110-266- C-76
W8JSU....73,140-106-230- C-31
W8YPT....65,448-108-202- B-26
K8NMG....51,660-105-164-AB-45
W8OKB....47,142- 97-162- C- -
W8KMD...34,632- 78-148- C-35
K8ANA....34,230- 70-163- A-30
WA8EWT..33,654- 71-158- A-46
W8IBX....32,980- 85-131- B-17
K8WVF....31,236- 76-139- C-36
W8GMK...25,830- 70-124- B-18
W8YGR....20,907- 69-101- A-16
W8NPF....13,818- 49- 94- B-31
K8MTI.....8640- 48- 60- B- 8
W8AJW.....6195- 35- 59- A- -
W8CLD.....2325- 25- 31- A- 8
WA8ETX....1173- 17- 23- A- -
WA8ILI.....1008- 14- 24- A-15
WA8GYX....420- 10- 14- A- 3
K8DWQ.....384- 8- 16- C- -
WA8HVR....150- 5- 10- A-10
WA8ETW.....75- 5- 5- A- -

CLUB SCORES

	Aggregate	*Entries*	*C. W. Winner*	*Phone Winner*
Frankford Radio Club	9,352,354	74	W3BES	W3BES
Potomac Valley Radio Club	8,244,726	29	W3GRF	W4BVV
Northern California DX Club	3,007,703	51	W6KG	K6OHJ
Virginia Century Club	2,351,848	15	W4DHZ/4	W4KWY
Southern California DX Club	1,571,817	17	W6IBD	W6RW[1]
Order of Boiled Owls of New York	1,465,962	9	W2AYJ	.....
Ohio Valley Amateur Radio Assn.	1,035,975	6	W8FGX	.....
Connecticut Wireless Assn.	644,004	5	W1BIH	.....
South Jersey Radio Assn.	571,953	22	W2DAJ	W2DAJ
Milwaukee Radio Amateurs' Club	425,145	4	W9GIL	.....
San Diego DX Club	398,285	4	W6EPZ	.....
Germantown Radio Club (Pa.)	310,459	4	K3KPV/3[2]	.....
Order of Boiled Owls of Ohio	274,672	5	W8ZCQ	.....
Tri-City Amateur Radio Club (Conn.)	222,360	6	W1WHQ	.....
West Park Radiops (Ohio)	202,011	12	W8YPT	W8IJZ
Central Michigan Amateur Radio Club	201,027	7	W8VPC	W8RXY
Motor City Radio Club (Mich.)	159,991	5	.....	W8ARH
Lake Success Radio Club (N. Y.)	159,300	3	.....	.....
Rochester DX Assn. (N. Y.)	148,869	4	.....	.....
Order of Boiled Owls of New Mexico	118,743	3	.....	.....
Suffolk County Radio Club (N. Y.)	87,447	5	W2GKZ	.....
Horseshoe Radio Club (Pa.)	75,192	7	W3LIV	W3LIV
North Penn Amateur Radio Club	67,434	5	K3HTZ	.....
Morris Radio Club (N. Y.)	64,056	5	K2SUX	.....
Gloucester County Amateur Radio Club (N. J.)	54,593	8	W2TLO	WA2QHQ
TELCO Amateur Radio Club of Manhattan	49,825	5	K2IBW	.....
Lynchburg Amateur Radio Club (Va.)	49,062	3	K4QKY	.....
Willamette Valley DX Club (Ore.)	14,562	4	.....	.....
Cherry Point Amateur Radio Club (N. C.)	15,261	3	.....	WØFPA/4
Roanoke Valley Amateur Radio Club	13,110	3	WA4SHD	.....
Bronx High School of Science Radio Club	3246	3	WA2UXZ	.....
New York Radio Club	2256	3	.....	.....

[1] W9WNV, opr. [2] K3MNJ, opr.

HUDSON DIVISION

Eastern New York

WA2OJD...357 060-220-541- C-74
W2HO....230,724-174-442- C-59
K2GDP...144,207-147-327- C- -
WB2FMK..65,835- 95-231- B-57
W2AWF...46,116- 84-183- C-22
K2IBW...37,240- 70-179- C-46
WA2ZBS..34,881- 77-151- B-40
W2VIR...11,520- 40- 96- C-12
WB2BAL...7380- 41- 60- C-17
WB2HBI...3174- 23- 46- A-17
W2JMZ....1305- 15- 29- A- 3
K2DBM....1188- 18- 22- C- 5
W2IP.....756- 14- 18- B- -
K2UTV[8].....3- 1- 1- A- 1

N. Y. C.-L. I.

W2AYJ...400,158-259-517- C-68
W2WZ....395,226,234,563- C-56
K2HWL..179,046-147-406- C- -
W2YCW...168,831-169-333- C-60
WB2CKS.160,272-168-320- C-56
W2IRV...125,631-141-297- B-42
W2PCJ...117,561-149-263- C-38
K2CLQ...111,633-127-293- C-60
WA2QMC.105,000-125-280- B-44
WA2KSD..71,910-102-235- B-30
W2GKZ....60,390-110-183- C-22
W2AZS....54,990- 94-195- C-31
W2CWD....45,966- 94-163- C-17
W2ZWW...41,852- 92-152- C- -
WA2TKL...34,188- 74-154-
ABC-19
W2ZKQ....34,170- 85-134- C- 8
K2KD.....18,144- 54-112- A-32
W2QZQ....14,994- 49-102- C-24
WB2JUC...14,382- 51- 95- A-44
W2GKW....13,992- 53- 88- B-18
WB2HQT...12,540- 44- 95- A-15
K2ZYR.....2772- 22- 42- A- -
W2EQG.....2280- 20- 38- B- -
WA2UXZ....1860- 20- 31- A- 3
WB2EJB....1311- 19- 23- A- 6
W2DTL.....1275- 17- 25- A-15
W2JB......828- 12- 23- A-12
WA2VLK....684- 12- 19- C- 5
W2BOT.....627- 11- 19- A- 3
WA2YJN....624- 13- 16- B- -
W2NCG.....360- 8- 15- A- 6
W2BPA.....198- 6- 11- B- 3
WA2WIJ.....75- 5- 5- A- -
WB2FPF.....72- 4- 6- A- 2
W2CKR......48- 4- 4- A- 2
WA2RJZ (WA2RJZ, WB2BJG)
24,888- 61-136-AB-50
WA2ZXL (WA2ZXL, WB2AZX)
17,484- 47-124- B-48

Northern New Jersey

W2GGE...380,700-225-566- C-54
W2VJN...283,404-226-418- C-51
K2KFP...122,553-153-267- C-24
W2HUG....76,398-107-238- A-42
WA2GIX...36,735- 79-155- C-25
W2EHN...31,500- 70-150- B-28
WB2CRP...30,843- 69-149- B-39
WA2PWL...30,015- 69-145- A-33
WB2DEP...18,096- 52-116- A-30
WA2VSQ....16 950- 50-113- A-47
WA2HNL...14,355- 55- 87- A-19
WB2CZZ....11,139- 47- 79- B- -
WA2MTL...11,088- 42- 88- A-12
K2SUX....10,578- 41- 86- C-20
W2NEP.....6480- 40- 54- A-20
W2HL......3612- 28- 43- C- 8
K2AX......3480- 29- 40- C- 6
W2ZKE.....2250- 25- 30- A-16
W2EQS.....2088- 24- 29-AC- -
W2LQP.....1377- 17- 27- A- 3
WB2GFY....765- 15- 17- A- 5
WB2GFQ....756- 12- 21- A-10

MIDWEST DIVISION

Iowa

WØFDI...76,230-121-210- C-33
WØHNA...68,040-108-210- C-49
WØLBS...27,948- 68-137- C-40
WØBSY.....3510- 30- 39- A-15
WØYTQ (WØs PKH YTQ)
237,690-190-417- C-68

Kansas

WØDAE...35,076- 79-148- C-20
K6SXX/Ø...1680- 20- 28- A- 6

Missouri

WØLBB....52,500-100-175- C-48
WØGNX....44,712- 92-162- C-47
WØGUV....41,223- 91-151- C-40
KØJPL....21,507- 67-107- B-21
WAØAJV....2250- 25- 30- A-12
WØNFA (4 oprs.)
388,416-23 -544- C-80

Nebraska

KØMUJ.....12- 2- 2- A- 3

NEW ENGLAND DIVISION

Connecticut

W1BIH...441,636-247-596- C-63
W1WHQ...126,162-129-326- B-50
W1TX....109,908-129-284-
ABC-44
W1WPO[8]...85,593-103-277- C- -
W1QV.....79,968-119-224- C-37
W1AH.....13,923- 51- 93-BC-40
K1MJG.....5075- 29- 59- - -
K1PN8.....5031- 39- 43-AC-20
W1IKE[8].....3648- 32- 38- B-10
K1ZND.....3312- 24- 46- A-14
W1ECH[8] 2652- 26- 34- A-11
K1DII.....2331- 21- 38- C- 6
K1GZJ.....1053- 13- 27- C- 6
W1BDI[8].....147- 7- 7- B- 1
W1AW (K1EUK, K2UTV)
3978- 26- 51- C-10

Division Leaders

Single Operator

C. W.		Phone
W3GRF	Atlantic	W3BES
W9IOP	Central	K9PNV
WØAIH	Dakota	WØCUC
W5CKY	Delta	W5AJY
W8FGX	Gr. Lakes	W4BCV
W2AYJ	Hudson	K2HLB
WØFDL	Midwest	WØLBB
W1BIH	New England	W1GKJ
W7PQE	Northwestern	K7QWI
K6ERV	Pacific	K6OHJ
W4KFC	Roanoke	W4BVV
W7PGS	Rocky Mountain	W5LEF
W4JDR	Southeastern	W4RLS
W6EPZ	Southwestern	W6RW
W5WZQ	West Gulf	W5KTR
VE2NV	Canadian	VE2UX/3

Maine

W1BFA....53,148- 86-208-BC-46
W1PDN.....273- 7- 11- B- 2

Eastern Massachusetts

K1NOL...352,944-228-516- C-50
W1BPW...253,305-195-433- C-70
W1JYH...214,525-195-365-AC-32
W1EVT...120,456-126-344- B-55
W1IAS....87,750-117-250- C-26
W1EHT....67,230- 90-249- B-41
W1KXP....28,731- 61-157- A-20
W1MRQ....20,670- 53-130- C- -
W1PLJ....17,784- 52-114- B-28
W1MO.....17,010- 63- 90- B-17
W1WLZ....16,377- 53-103- C-29
WA1ANR...15,582- 53- 98- A-17
W1KRD....12,896- 52- 86- A-23
K1ZHS....10,320- 43- 80- A-15
W1MX[9].....5508- 34- 54- A-15
W1NS.....4340- 28- 52- B- 4
K1SZN....4154- 31- 45- B-30
WØPAN/1...4125- 25- 55- A-19
W1DDO....2184- 26- 28- A- 8
K1TCE.....1824- 19- 32- B- 5
K1RHZ.....1216- 16- 26- A- 7
W1RWU.....540- 10- 18- B- 8
W1BB......510- 10- 17- A- -
W1BU (9 oprs.)
827,982-342-807-AC-90

Western Massachusetts

W1UUK...81,252-111-244- B-44
W1DGT....56,580- 92-205- B-30
W1EZD....45,090- 90-167- C-38
K1OOV....12,939- 57- 76- C-22
K1FJS....10,044- 36- 93- A- -
K1ITU....3168- 24- 44- C-16

New Hampshire

W1FZ.....196,056-168-389- C- -
W1PYM...62,478- 89-234- C-41
W1PEG....30,600- 68-154- B-53
K1UHE.....3483- 27- 43- B- 4
W1SWX/1...2673- 27- 33- B- 5

Rhode Island

K1LPL....110,922-133-278- A-40
W1GOG....65,007- 93-233- B-23
K1EWL....44,469- 81-183- B-35
W1AWE....26,400- 55-160- - -
W1RFQ....11,730- 46- 85- B-10
K1DFT....10,647- 39- 91- B-44
K1VSK.....4116- 28- 49- A-15

Vermont

W1SEO.....8790- 30- 98- A-11
K1TTW.....1728- 16- 36- A- 9

NORTHWESTERN DIVISION

Alaska

KL7CYS...11,480- 40- 99- A-31

Montana

W7EWR.....714- 14- 17- A- 8

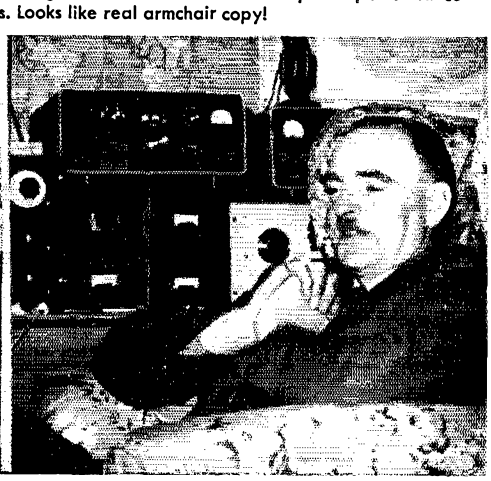
Oregon

W7BTH....38,151- 81-157- C-18
W7BGG....34,344- 72-163- B-57
W7DLR.....4524- 29- 53- C-11
K7VYU.....3624- 24- 51- C-50
K7QNQ.....561- 11- 17- A-10
W7AXJ (W7s AXJ YWA)
31,185- 77-135- C1-8

Washington

W7PQE...101,398-121-280- C-45
W7MX....45,120- 80-188- B-55

A typical DX multiop arrangement: on the left GW3DIX aiding GW3NWV in an excellent phone performance with almost 1200 vocal exchanges. Looks like real armchair copy!



TOP TEN W/VE High Scorers
Under 150 Watts Only

C. W.		Phone	
K1LPL	110,922	WA2OOO	58,236
W2HUG	76,398	WA2GSO	49,248
K4YFQ	75,446	VE2ANK	43,326
W3CAA	49,128	WA4AWG	41,580
WA6OJM	47,094	VE3PV	40,590
W3ECR	45,936	WA5ALB	36,540
W8DGP	34,602	WA2PWI	24,186
K8ANA	34,230	WA8CZH	23,400
WA8EWT	33,654	VE2AMW	21,840
WA4DUS	32,856	W1YQF	21,294

W7MH....16,200- 50-108- B-27
K7QXL....6510- 35- 62- C-35
K7PJT....1740- 20- 29- B-15
W7VRO....1260- 15- 28- A- 3
K7QKB....196- 7- 10- C-12

PACIFIC DIVISION

Hawaii

KH6FIF...62,685-105-199-AC-36
KH6FIE....5771- 29- 67- B-18

Nevada

W7VIU....1014- 13- 26- B- 3

Santa Clara Valley

K6ERV[10]..278,568-212-438- C-90
W6WX...234,000-195-400- C-60
WA6QGW.210,684-181-388- C- -
W6SC....169,248-172-328- C-62
W6ZMW...99,774-138-241- C-54
W6ISQ....97,152-128-253- C-30
W6HOC...85,806-126-227- C-30
K6HOR...84,870-123-230-AC-46
W6JKJ....66,768-107-208- C-35
W6CBE....48,024- 92-174- C-36
W6UMI....40,455- 87-155- C-60
WA6PMK..31,200- 75-139- B- -
WA6TGY...30,876- 83-124- C-12
WA6HRS..24,480- 68-120- B-20
W6MVL...21,507- 67-107- C-16
W6VVR...21,390- 62-115- C-31
W6JWD...20,274- 62-109- C-30
W6GQK....12,792- 52- 82- C-19
K6TZX....10,560- 44- 80- B-23
W6RFF....7980- 38- 70-BC-12
W6KHS....7749- 41- 63- A-10
W6CLZ....4371- 31- 47- B- 8
W6KEV....630- 14- 15- C- 3
WB6BFH....63- 3- 7- A- 2
W6YX (W6UQC, W7YAQ)
1248- 16- 26- C- 4

East Bay

W6KG....267,444-204-437- C-84
W6LLD...185,850-175-354- C-85
K6AHV...114,168-142-268- C-40
W6BSY....90,174-133-226- C-58
W6PQW....69,993-101-231- C- -
W6RGG/6..60,528-104-194- C-50
WA6UUS...56,736- 96-199- B-60
W6FLT....12,558- 46- 91- C-15
WA6VAT...10,191- 43- 79- A-20
W6KEK....9417- 43- 73- C-10
W6EJA....858- 13- 22- B- 3
WB6ETY....18- 2- 3- A- 3

San Francisco

W6WB....175,551-163-359- C-48
W6ERS....97,890-130-251- C-75
W6MSM...57,159- 87-219- C-53
K6IXS....38,304- 84-152- C-57
WA6IVM...16,000- 50-107- C-35

Sacramento Valley

W6GRX..222,300-195-380- C-72
W6BIL....16,848- 54-104- C-55
W6AF.....3354- 26- 43- C-26
K6DQB....1008- 14- 25- A-31

DX'ERS' ENTHUSIASM...

...WIBPW HIT THE KEY SO HARD AT THE OPENER HIS TABLE GAVE WAY

San Joaquin Valley

W6BVM...76,923-111-239- - -
W6KTW...72,105-115-209- C-50
W6WWD...7524- 38- 68- B-13
W6AFH....6831- 33- 69- C-32

ROANOKE DIVISION

North Carolina

W4RWL....6680- 40- 57- B-31
K4MWB....4185- 31- 45- A- 7
W4OMW....3198- 26- 41- B- -
WA4FFW...1701- 21- 27- A-17
WA4CJV....630- 14- 15- C- 4

South Carolina

WA4IKU...31,104- 81-128- B-35
K4YYL....18,300- 61-100- B- -
K4MUP....630- 14- 15- B- 5
W4JA.....324- 9- 12- B- 1

Virginia

W4KFC...713,475-315-755- C-72
W4DHZ/4 628,056-286-732- C-96
W4LSG...350,325-225-519- C-80
W4JAT...181,770-166-365- C-50
WA4RAK..98,490- 98-335- C-62
W4OPM...74,778-103-242- C-30
W4RVW...47,793- 89-179- C-20
K4ASU....46,155- 85-181- C-10
WA4DUS..32,856- 74-148- A-41
K4QKY....24,381- 63-129- C-31
W4ZM.....23,241- 61-127- C-11
W4WBC....22,311- 67-111- C-24
W4KMS....21,384- 66-108- B-25
W4CQI....18,720- 60-104- B-15
W4DVT....15,561- 57- 91- A-20
W4DLA....9120- 48- 65- B-18
W4LRN....9072- 42- 72- C-18
WA4SHD...6786- 39- 58- B-13
W4SHJ....5394- 31- 58- B-10
K4WVT....4704- 28- 56- A- -
K4IKF....1620- 20- 27- A- 5
W4KXV (6 oprs.)
883,116-333-884-AC-96
K4LIQ (K4s LIQ SXT)
711,136-313-758-AC-90
W4BVV (K4VWH, W4BVV, WA4IVL)
497,154-266-625-AC-96

ROCKY MOUNTAIN DIVISION

Colorado

KØMIC[11]..202,200-200-337- C-64
WØCDP...167,400-155-360- C-43
KØVFN....1197- 19- 21- B- 9
KØKKU (KØsEZH, KKU)
126,096-142-296- C-80
WØEZO (WØEZO, WAØs BAD BAE)....18,150- 55-110- C-25

Utah

W7NPU....21,344- 58-124- B-43
W7POU....3741- 29- 43- A-31

New Mexico

K5STL....72,267-109-221- B-49

Wyoming

W7PGS...247,426-193-428- C-56

West Virginia

W8UMR...25,146- 66-127- A-15
WA8AIL...12,276- 44- 93- A-20

SOUTHEASTERN DIVISION

Alabama

W4PRP....95,160-130-244- C-24
W4DS.....1575- 21- 25- - -

Eastern Florida

W4JDR...381,018-251-506- C-86
K4RQE....85,888-128-227- B-39
K4YFQ....75,446-119-212- A-61
W8CHZ/4..57,300-100-191- B-10
WA4HKJ....42,952- 91-158- C-22
W4NTE....19,656- 56-117- A-96
W4WYJ....15,066- 54- 93- A-17
K4EJ.....5550- 37- 50- A-25
W8ZL/4....5040- 30- 56- B-22
WA4IJM....4200- 28- 50- A- 8
WA4QPV....3255- 31- 35- A- -
W4EEO....2700- 30- 30- C-20
W4LJE....624- 13- 16- A-12

Western Florida

W4NIX....35,040- 80-146- B-60
W4SHW....24,780- 70-118- A-24
K4VFY....20,496- 61-112- A- 8

Georgia

W4MCM...341,925-235-485- C-64
W4DXI...219,852-197-373-
ABC-80
K4ADU....61,446- 98-209- B-82
K4EWG....28,152- 68-138- B-21
W4BHG....7326- 33- 74- B- 8
K4JSZ....5994- 37- 54- A-10
W4HOS (W4s FRO HOS)
37,440- 78-160- B-55

SOUTHWESTERN DIVISION

Los Angeles

W6IBD...236,874-194-407- C-74
W6LDA....67,144-109-206- C-60
WA6AYU...60,255-103-195- C-34
W6BUD....59,100-100-198- C-40
W6NEX....49,662- 89-186- C-44
W6FET....23,256- 68-114- C-37
WA6KNE..22,200- 74-100- C-42
K6KII....20,544- 64-107- A-31
W6APH....18,810- 57-110- A-42
W6AM.....10,865- 43- 85- C- 7
W6ZMX/6...4464- 31- 48- C-18
WB6BEE....1200- 16- 25- C- 9
WA6KHK....1027- 13- 27- A- 7
WB6HTC.....765- 15- 17- A- 8
WA6ZMR....319- 11- 13- A-12
WB6BFI.....162- 6- 9- A- 8
W6RW (9 oprs.)
397,404-249-532-AC-48
W6DFY (W6DFY, WA6MUK)
221,580-180-411- C-48

Arizona

W7IMA....28,137- 83-113- B- -
K7TNW....20,670- 65-106- B-27
W7ENA....6552- 39- 56- A- 8

San Diego

W6EPZ...301,620-220-457- C-60
W6LCX...196,470-177-370- C-65
WA6SBO...30,603-101-101 C-28
W6CHV....20,280- 65-104- B-27
WA6DMN...9450- 42- 75- B-10
WB6CWD...8541- 39- 73- C- -
WA6WTD...1320- 30- 48- A-36
WA6RUS....1004- 16- 23- A-10
WB6GFZ....432- 9- 16- A- 8
WA6WPG....120- 5- 8- A- 4
WA6DWH....75- 5- 5- A- 2
W6VSS (8 oprs.)
1,069,281-387-921-AC- -
WA6ZPI (WA6s CGP ZPI)
8424- 39- 72- B-96

Santa Barbara

WA6OJM...47,094- 94-167- A-55
WB6DPV....240- 8- 10- A- 5

W8FGX turned in an 85-hour 160-10 meter effort to the tune of 656-K, leading his section and division on c.w. and taking the OVARA c.w. club award.

QST for

WEST GULF DIVISION

Northern Texas

WA5CBE..93,141-131-237- B-56
WA5BFB[12]..33,777- 81-139- C-50
W5CYE....31,302- 74-141- C-33
K5QMC....28,677- 79-121- C-80
WA5DFR....3480- 29- 40- A-21

Oklahoma

K5OCX....12,528- 48- 87- A-10
W4SKT/5....1072- 16- 23- A-22

Southern Texas

W5WZQ...293,436-234-418- C-57
W5BRR...266,220-204-435- C-82
K5HRR[13]
210,816-192-366-ABC-45
W5ZD....173,802-166-349- C- –
W5MCO....54,945- 99-185- C-55
WA5CIY.....918- 17- 18- B- 4
WA5HEP (2 oprs.)
882- 14- 21- B-26

CANADIAN DIVISION

Maritime

K5YAA/VO1
161,820-145-372- C-53
VE1EK....20,160- 56-120- A-26
VO1AW.....8178- 29- 94- A- 9
VE1AL.....1536- 27- 58- A-14
VE1YB.....3007- 31- 33- B-20

Quebec

VE2NV...214,800-200-408- B-75
VE2WA...126,336-128-329- C- –
VE2BV....35,088- 68-172- B-13
VE2AWR....3036- 23- 44- B- 8

Ontario

VE3BOG..110,370-130-283- C-50
VE3ES.....38,415- 65-197- B-31
VE3AU....17,253- 71- 81- B-14
VE3PV....17,004- 52-109- B- –
VE3AWE...10,458- 42- 83- B-12
VE3EBP.....1620- 18- 30- A-50
VE3BNH.....3- 1- 1- A- 6

Manitoba

VE4ZX.....10,320- 43- 80-AB-35

Saskatchewan

VE5US.....50,052- 86-194- C-37
VE5PM....16,200- 54-100- B- –

Alberta

VE6TP.....37,740- 74-170- C-21
VE6IT (4 oprs.)
18,228- 49-124- B-40

British Columbia

VE7BHW.....126- 3- 14- A- 2
VE7VC (VE7s AHG VC)
131,238-138-317- C-80

AFRICA

Morocco

CN8FW...246,240-48-1710- A-35
CN8GC....31,146-29- 358- A-36

Mozambique

CR7LU....26,784-32- 279- A-22
CR7IZ.....18,538-26- 246- A- –

Sudan

ST2AR.....18,984-28- 226- A- –

The Gambia

ZD3A.....53,724-44- 409- A-24

Southern Rhodesia

ZE3JJ.....12,430-22- 189- A- 6

South Africa

ZS6FN.....38,958-43- 302- A- 9
ZS2RM....14,790-29- 170- A-16
ZS1O.....2567-17- 52- A- –

Southwest Africa

ZS3EW.....28,512-32- 299- A-12

Swaziland

ZS7M.....2730-14- 66- A- 3

Libya

5A3TX.....54,670-35- 525- A- –

Malagasy Republic

5R8AI.....2400-10- 80- A- –
5R8AM.....1494- 9- 56- A- –

Somali Republic

6O6BW....46,944-32- 489- C-12

Sierra Leone

9LITL.....85,950-45- 661- A-42

Republic of the Congo

9Q5AB....224,046-54-1383- A- –

ASIA

Iran

G2RO/EP.....54- 3- 6- A- 5

Korea

HL9KA.....2178-11- 59- A- 7

Japan

JA1BRK..237,384-58-1413- B-70
JA1VX....227,988-54-1410- C-50
JA1CG.....67,860-45- 504- A-51
JA2DN.....64,460-44- 489- B-44
JA7AD.....18,564-28- 221- A-21
JA7JI.....12,960-18- 240- A- –
KA2LD....10,332-18- 211-BC-10
JA6AKW....8890-14- 217- A- –
JA2WB.....6858-18- 129- A-41
JA8GR.....3982-11- 122- A- –
JA7AKQ.....2814- 7- 134- A- –
JA1NLX.....790- 5- 54- A- 8
JA1CJU.....576- 8- 24- A- 8
JA1ORM.....144- 4- 13- A- 4
JA1CUM.....30- 2- 5- A- –
KA2KS (4 oprs.)
71,592-38- 628-AC-30

Mongolia

JT1CA.....2650-10- 89- B- –

Ryukyus

KR6BQ....44,352-33- 450- A-37

Lebanon

OD5AX.....9954-21- 158- A- –
OD5LX.....1930-10- 65- A- 2

Asiatic Russian S. F. S. R.

UA0KCO...16,320-16- 346- B- –
UW0IP.....8755-17- 172- A- –
UA9KQA....4050-15- 90- B- –
UW9OU.....3735-15- 83- A- –
UW0IX.....3420-12- 95- A- –
UA0KSB....2940-12- 83- B- –
UA0GM.....1908-12- 53- A- –
UA9WR.....1512-12- 42- A- –
UW9CD.....936-12- 27- A- –
UA0KZD.....764- 4- 64- B- –
UA9KHA.....385- 7- 20- B- –
UA9KSC.....60- 4- 5- B- –
UA9CC.....48- 4- 4- B- –
UA9KHA.....3- 1- 1- B- –
UA0KFG (UA0EH, UW0s
FK FM) 126,762-37-1142- B-96
UA0KDA (3 oprs.)
5415-15- 121- B- –
UA0KYA (3 oprs.)
3399-11- 103- A- –
UA9WS (2 oprs.)
3168-16- 66- A- –
UA9MR (UA9s MO MR)
1482-13- 38- A- –

Turkoman

UH8DA.....1914-11- 58- B- –
UH8KAA.....462- 7- 22- B- –
UH8BO.....66- 2- 12- B- –
UH8DE.....18- 2- 3- A- –

Uzbek

UI8CT.....216- 3- 24- A- –

Tadzhik

UJ8AH.....2190-10- 73- A- –

Kirghiz

UM8KAA....2028-13- 52- B- –

Western Malaysia

VS1LP.....74,433-43- 580- A-40
VS1JW.....2930-10- 98- A- –

Hong Kong

VS6FF.....4488-12- 127- A- 9

India

VU2AJ.....4998-14- 124- A- –

Kuwait

9K2AN.....1512- 8- 64- A- 7

EUROPE

Germany

DL7AA...273,978-62-1473-AB-70
DL1KB...244,122-61-1334- B-44
DL9PU....76,770-45- 571- B-40
DL1JW....18,396-37- 439- B-24
DM4YPL..41,805-45- 315- A- –
DJ2SR....35,454-38- 311- A-28
DL4IM....33,228-39- 292- A-15
DM4WPL..20,944-28- 251- A- –
DM2AUO..17,395-35- 168- B- –
DJ6WD....14,868-28- 177- A-24
DJ3XK....14,352-28- 173- A- –
DJ5GG....14,500-25- 194- B- –
DL8CM....12,120-20- 203- A- –
DM3ZYH....4858-14- 118- A- –
DL1XA.....1848-24- 68- A-12
DJ6LN.....1494-14- 107- A-16
DM3SBM....1347-23- 65- B- –
DJ1RZ.....3942-18- 73- B- 6
DL8AJ.....2788-17- 55- B- –
DJ1VI.....2646-18- 49- A-21
DL6VP.....2280-12- 66- A-16
DL1JG.....2208-16- 50- A- –
DJ6GS.....1834-14- 44- B- –
DM3DG.....1771-11- 55- A- –
DM3ZCG....1107- 9- 11- A- –
DM2ATL.....720- 8- 30- A- –
DM3WML....513- 9- 19- B- –
DM3ZBM.....352- 8- 15- B- –
DJ5FD.....18- 2- 3- A- –
DJ5BV (DJ5s BV EO)
250,632-59-1416- B-69
DM3EN (5 oprs.)
1014-13- 26- B- –

Spain

EA3KT....29,667-31- 319- A-48

Republic of Ireland

EI9J.....32,708-37- 298- A-11
EI9F.....2241- 9- 83- A- –

France

F8IH.....237,840-60-1366- A- –
F8VJ.....163,510-52-1052- A-46
F8ZF.....25,172-31- 279- A-32
F8TM.....10,250-30- 125- A- –
F2PO.....9366-21- 151- A-19
F2GO.....3685-11- 113- A- 7
F3PK.....2664-12- 74- A- –
F3BX.....1512- 8- 63- A- –
F8VO.....999- 9- 37- A- –
F3II.....567- 9- 21- A- –

England

G4CP.....322,494-59-1822- A-62
G2QT.....176,400-60- 980- A- –
G2DC.....136,584-56- 813- A- –
G3EYN....87,079-53- 548- A- –
G2RO.....73,632-48- 516- A-31
G3APN....56,286-59- 318- A- –
G8BM.....19,620-30- 223- A-24
G3KSH.....2142-17- 43- A- 5
G3JFY.....1848-14- 45- A- 8

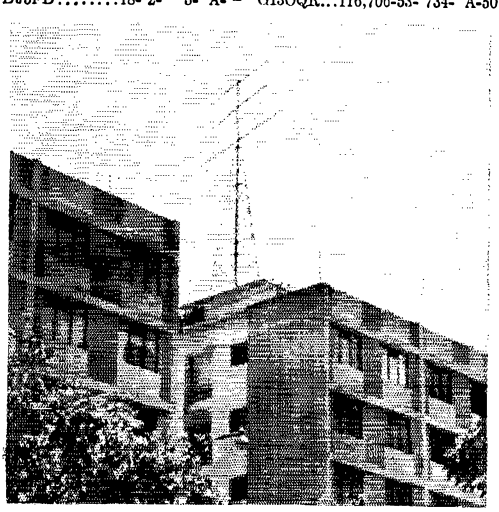
Northern Ireland

GI3OTV..141,245-53- 900- A-47
GI3OQR...116,706-53- 734- A-50

Multioperator Scores

Top Ten

C. W.		Phone	
W3MSK	KZ5FC	W3MSK	YV5AHG
W6VSS	DJ5BV	W8NWO	KP4AXM
W4KXV	ZL2AWJ	W3WJD	DL4OV
W1BU	HA5KBB	W8NGO	GW3NWV
K4LIQ	SM6CKV	W3GHM	G3KFX
W3WJD	KP4AXM	K0BJK	9A1AIJ
W3VKD	OH2QV	W3GRS	IIBAF
W3TMZ	KP4BMJ	W3MWC	4U1ITU
W3GHM	GW3ITZ	W3KFQ	SM6BJI
WB2APG	KA2KS	W0QUU	G3LDI



YV5BIG's call is appropriate for his roof-top antenna farm. Raul topped Venezuela and S.A. on A-3 running one kw p.e.p. Antennas up there include a 3-L homebrew 20-meter beam, 4-L homebrew 15-meter array, an inverted-V rotatable dipole for 40 and dipoles on 80 and 10.

Scotland

GM5GH.....3588-13- 92- A- 9

Wales

GW3JI....245,616-56-1462- A- -
GW3ITZ (4 oprs.)
98,000-40- 834- A-85

Hungary

HA1KSA..196,503-51-1307-AB-58
HA1SD....15,312-22- 232- A- -
HA5DU.....1210-10- 41- A- -
HA8KCI.....980-10- 33- A- -
HA5KBB (7 oprs.)
246,480-60-1372- B-90

Switzerland

HB9JG....234,630-55-1425- B-41
HB9MO...100,405-13- 778- B- -
HB9KC....83,520-40- 696-AB-36
HB9DX....22,356-27- 276- A- -
HB9ZY....14,490-23- 210- B- -
HB9UD.....450-10- 15- B- 5

Italy

I1ZIX.....156,594-49-1072- A-54
I1GO.....83,958-42- 676- A-45
I1SF.....12,627-23- 187- A-15
IT1AGA....11,450-25- 154- A-29
I1VAB.....5073-19- 89- A-24
I1ER.....4980-20- 83- A-43

Norway

LA1H[14].....79,101-33- 800- A-60
LA5HE.....21,252-23- 308- A- -
LA6U.....16,956-27- 213- A- 8
LA4KG....14,322-22- 218- A-20
LA6FI.....10,727-17- 213- A-23
LA2Q.....7290-15- 162- A-16
LA3UF.....6380-16- 135- A- -
LA7H.....3468-17- 68- A- -
LA6CF.....378- 9- 14- A- -

Luxembourg

LX3AX....98,031-41- 797- A-30

Bulgaria

LZ1KSA.....5520-16- 115- A- -
LZ2BC.....2028-13- 53- A- -
LZ2FN.....1890- 9- 70- A- -

Austria

OE5KE....97,825-43- 764- B-55
OE1HGW....6720-16- 140- A-15

Finland

OH1SH....115,920-46- 842- B- -
OH2FS.....74,250-30- 825- B-49
OH5PT....18,837-21- 299- A-41
OH5UV....10,218-26- 131- A- -
OH5VF.....9540-20- 162- B- -
OH5TM.....4800-20- 80- A- -
OH5UY.....4641-17- 91- A- -
OH1PI.....4635-15- 105- B- 7
OH2BDB....4335-17- 85- B- -
OH3TA.....3230-19- 57- A- -
OH5VD.....2256-16- 47- B- 5
OH2BAC....2160-15- 48- A- -
OH1VR.....2145-13- 55- A- -
OH2YL.....1872-16- 39- B- -
OH5OL.....1728-12- 48- A- -
OH2BAH....1365-13- 35- B- -
OH5TQ.....1218-14- 29- A- -
OH2BS.....780-13- 20- A- -
OH3NR.....759-11- 23- A- -
OH2BCZ.....680- 8- 29- A- -
OH2QV (OH2s BH QV)
131,967 43-1023- B- -
OH2BAZ (multiopr.)
28,527-37- 257- B- -
OH6AA (5 oprs.)
5355-21- 85- A-30
OH2BH (OH2s BH QV)
2430-15- 54- B- -
OH2AF (OH2s BG VB)
2124-12- 60- A- -

Czechoslovakia

OK1ZL....220,365-59-1245- B-70
OK1GT...169,650-50-1131- B- -
OK1AFC...100,035-45- 741- A-55
OK1ADM...37,590-42- 299- A- -
OK1AGI...36,072-36- 337- A- -
OK1IQ....30,720-32- 320- B- -
OK2QX....18,972-36- 178- A- -
OK3SK....14,410-22- 224- B- -
OK3UL....11,180 26- 145- A- -
OK1AHZ...10,584-28- 126- A- -
OK3CCC.....5746-17- 114- A- -
OK2ABU....5358-19- 96- B- -
OK2KJU....5313-21- 85- A- -
OK2OQ.....3672-12- 103- A- -
OK1AEV....2145-13- 55- A- -
OK2BBJ....1830-15- 41- A- -
OK1TW.....890-10- 30- B- -
OK2BCA....792-12- 22- A- -
OK3CAU....770-10- 26- A- -
OK1ZW.....564-12- 16- A- -
OK1GO.....450- 5- 30- A- -
OK1AGV....414- 9- 16- A- -
OK2KMB....360- 5- 24- A- -
OK2LN.....315- 7- 15- B- -
OK2BGH.....27- 3- 3- A- -
OK1TL (multiopr.)
86,258-43- 692- A- -
OK3KAG (3 oprs.)
24,769-31- 267- A- -
OK2KMB (2 oprs.)
15,249-23- 221- A- -

This artistic pose was struck by ZE3JJ prior to c.w. two-ways in the test.

Belgium

ON4XG....49,950-37- 450- A-36
ON4GU....18,819-17- 369- A-36

Denmark

OZ3FL....205,128-56-1221- A- -
OZ1W....123,981-51- 815- A-60
OZ5DX....34,675-19- 613- B- -
OZ7G.....14,400-16- 303- A- -
OZ4H.....12,717-27- 157- A- -
OZ4DX.....5066-17- 100- A- -
OZ4RT.....4800-20- 80- A- -
OZ1HX.....4208-16- 88- A- -
OZ7JT.....928- 8- 40- A-10
OZ7BQ.....192- 6- 11-AB- -

Netherlands

PAØLOU...119,808-48- 837- A-38
PAØVB....39,216-43- 304- A- -
PAØWAC...23,400-25- 312- A-16

Sweden

SM3TW....72,828-12- 578- B- -
SL5ZL[16]....68,760-40- 573- B- -
SM5CCE...33,408-32- 353- B-16
SM5UU....14,688-34- 144- B-24
SM4CMG...13,416-26- 174- A-16
SM7TV....11,523-23- 167- A-14
SM6UG.....9758-17- 196- A-18
SM5KV.....7771-19- 137- A- -
SM5BPJ....7104-16- 148- B- -
SM7CPY....5213-13- 134- A- 8
SM1CXE....2016-14- 48- B- 7
SM7AUO....1500-12- 42- B- 7
SM5BDY....1485-15- 33- A- -
SM3SV.....1014-13- 26- A- -
SM5AQI.....780-13- 20- A- 5
SM5DKH....624- 8- 26- A- -
SM5BLU.....540- 9- 20- A- 5
SM5BUX.....408- 8- 17- A- -
SM7BUE.....18- 2- 3- A- -
SM6CKV (6 oprs.)
235,306-58-1356- B-59
SM5BDS (SM5s BAU BDS)
9820-20- 165- B- -

Poland

SP6AAT...94,464-41- 786- B-43
SP6FZ....88,434-51- 579-BC-50
SP1HU....35,045-33- 467- B- -
SP6ALL...18,879-29- 218- A-35
SP6AKK...14,675-25- 200- A-30
SP5AHL...14,508-26- 186- A-19
SP5AHW...11,580-20- 193- A-21
SP5AFL....7684-17- 151- B-17
SP8MJ.....7240-20- 121- A-33
SP5ADZ....4158-18- 80- A- 4
SP6SO.....3096-12- 86- A- -
SP9ADU....2754-18- 52- A- 4
SP8ABQ....2028-13- 52- A- -
SP2IU.....1548-12- 41- B- -
SP9AGS....810-10- 27- A- -
SP6ALD....680- 8- 20- A- -
SP8ARY....435- 5- 20- A- -
SP9AMA....162- 6- 9- A- -

Greece

SVØWAA...11,242-22- 171- A-25

Iceland

TF3AB....18,252-26- 234- A- -
TF3KB.....9072-24- 128- A- -
TF2WIL....5460-14- 131- A- 6
TF3DX.....627-11- 20- A- 2

European Russian S. F. S. R.

UA1KBB...21,060-26- 270- B- -
UA3UJ....14,007-23- 208- A- -
UA6FD.....3731-13- 97- B- -
UA3BK.....3024-14- 72- A- -
UA3DR.....2637- 9- 98- B- -
UA4IB.....2178-14- 59- B- -
UA1FJ.....972- 9- 36- A- -
UA3TA.....756-12- 21- A- 4
UA3KWB....729- 9- 27- B- -
UA1IN.....510-10- 18- A- -
UV3TC.....515- 7- 25- A- -
UW4HW.....108- 6- 6- A- -
UA1DI.....90- 5- 6- B- -
UA3KQB (3 oprs.)
68,479-26- 745- B- -
UA1KGC (2 oprs.)
15,210-26- 195- B-24
UA1KBW (3 oprs.)
6240-13- 160- B- -
UA6KAF (2 oprs.)
5715-15- 127- A- -
UA3KTU (3 oprs.)
1260- 12- 35- A- -
UA3KHA (2 oprs.)
858- 11- 26- B- -
UA3KYI (2 oprs.)
432- 9- 16- A- -

Kaliningradsk

UA2KAK....7290-15- 162- A- -

Ukraine

UB5ZV.....29,727-27- 370- B- -
UB5OD.....9044-19- 160- A- -
UB5ZL.....2835-15- 63- A- -
UB5KAI.....2088-12- 58- B- -
UB5TQ.....1872- 8- 78- A- -
UB5FG.....684- 6- 38- A- -
UB5KUJ.....180- 4- 15- A- -
UB5KED (2 oprs.)
29,187-27- 374- B- -

White Russian S. F. S. R.

UC2AW....14,868-21- 236- A- -
UC2KSA (3 oprs.)
9450-18- 105- B- -

Azerbaijan

UD6BZ.....891-11- 27- A- -
UD6BD.....315- 7- 15- A- -
UD6AX.....120- 5- 8- B- -
UD6FA.....30- 2- 5- A- -

Georgia

UF6DD.....1320-10- 46- A- 8

Armenia

UG6KAA (3 oprs.)
1440-10- 48- A- -

Moldavia

UO5BM....11,148-27- 508- A-20

Lithuania

UP2KBC[16]..35,757-29- 411- B- -
UP2OO....27,300-25- 364- A- -
UP2NR.....957- 11- 29- A- -
UP2AW.....270- 6- 15- A- -

Latvia

UQ2KAE (2 oprs.)
4248-12- 118- A- -

Estonia

UR2DZ.....2120-10- 72- A- -
UR2KAN (3 oprs.)
13,875-25- 187- B-22

Rumania

YO7DO....48,840-37- 450- A- -
YO8CF....17,241-21- 274- B- -
YO2BU....13,750-22- 210- B- -
YO7DL.....8100-15- 180- A- -
YO3FF.....5712-17- 113- B- -
YO3CR.....3690-15- 82- A- -
YO6SD.....3096- 8- 129- A- -
YO4KAK.....777- 7- 37- A- -
YO8OU.....736- 8- 31- A- -
YO5MU.....432- 6- 24- A- -
YO9HP.....288- 6- 16- A- -
YO4YR.....180- 4- 15- A- -
YO3RF.....156- 4- 13- B- -
YO7VS.....99- 3- 11- A- -
YO5KAI[17].....90- 5- 6- A- -
YO4WU.....64- 4- 6- A- -
YO6KAF (YO6s EH UX)
3420-12- 95- A- -

Yugoslavia

YU4JOP....13,248-18- 248- A-66
YU1AFG...12,159-21- 193- A-60
YU1EXY....6579-17- 134- A- -
YU1BCD (4 oprs.)
36,828-33- 383- B-80
YU1JRS (5 oprs.)
28,170-26- 365- A- -
YU2AKL (3 oprs.)
13,948-22- 215- A-80
YU2HH (3 oprs.)
10,280-20- 172- A-16

Malta

ZB1BX....59,805-45- 443- A-79

I.T.U., Geneva

4U1ITU (7 oprs.)
91,440-40- 779-BC-35

NORTH AMERICA

Panama

HP1HE....547,008-74-2589- A-72

Puerto Rico

KP4AOO..509,976-72-2361- A-68
KP4BJU..437,400-72-2025- B-50

KP4CC...362,871-69-1753- B-62
KP4RK...20,340-30- 226- A- 7
KP4BAE...1128- 8- 47- B- 2
KP4AXM (5 oprs.)
211,410-58-1236-AB-88
KP4BMJ (KP4s BMJ BPG, WP4BNN)
146,452-47-1044- A-71

Canal Zone

KZ5FC (5 oprs.)
280,704-68- 1376- C-32

Greenland

OX3LLD...40,560-30- 451- A- –

Netherlands Antilles

PJ2AE...200,256-64-1043-AC-35

Guatemala

TG9AD...75,284-44- 571- C-17
TG9SC...49,896-42- 400- B-19

St. Kitts, Nevis

VP2KR...51,408-42- 408- A-20

Barbados

VP6AF...89,088-58- 532- A-30
VP6AT...18,304-22- 284- A- –

Bahamas

VP7BG...29,016-31- 312- A- 8

Bermudas

VP9L[18]... 327,540-53-2060- A-58

Mexico

XE2AAG...53,000-40- 448- A-38
XE1NL...42,914-43- 337- A-15
XE0CS (K6s ICQ ICS)
2771-17- 55- A- 5

Jamaica

6YAXG...22,202-34- 218- A- 7
6YACZ...1332-12- 38- A- 7

OCEANIA

Eastern Carolines

KC6BK...116,460-60- 647- A- –

Guam

KG6AAY[19]..324,608-64-1706- C-65
K9CVJ/KG6..5736-24- 80- C-13

Marshalls

KX6BU[20]..180,000-60-1000- C-22
KX6AJ...129,582-46- 939- A-31

Australia

VK5ZP...185,542-58-1069- A-56
VK3TL...82,560-40- 696- A- –
VK2GW...68,448-46- 496- A-40
VK5TC...46,483-47- 330- A-30
VK3ZR...21,779-29- 251- A- –
VK3AXK..14,214-23- 206- A-18
VK3XB...10,603-23- 154- A- –
VK2ADE...9918-19- 174- A- –
VK2QL...8300-25- 112- A- –
VK3RJ...1683-17- 33- A- 6
VK3KS...1122-11- 34- A- –
VK3QV...781-11- 24- A- 4
VK4KX...27- 3- 3- A- –
VK5KO...12- 2- 2- A- 1

Gilberts

VR1B...35,373-39- 303- A-21

Fiji Islands

VR2DK...40,716-39- 350- A-23

New Hebrides

YJ1DL...18- 4- 4- A- –

Cook Islands

ZK1AR...111,936-53- 704- A-35

New Zealand

ZL3VI...7614-27- 282- A- –
ZL1GX...1881-11- 57- A- –
ZL2AWJ (ZL2s AWJ RA)
219,600-64-1300- A-72

SOUTH AMERICA

Chile

CE1AD...454,320-72-2104- B- –
CE2CR...9690-30- 109- A-10

Bolivia

CP3CN...15,750-21- 250- A-23

Uruguay

CX1OP...21,897-27- 237- A- –

Colombia

HK3RQ...357,345-67-1793- A-43
HK7ZT...197,080-65-1012- A-55
HK7AHM..81,720-36- 759- A-41
HK4EB...780-13- 20- B- 5

Antarctica

KC4USB[21]..40,350-25- 538- C-14

Argentina

LU6PK...62,970-30- 700- A-31

Brazil

PY2BGL...32,040-30- 356- A- –
PY1NEW..30,419-19- 537- B-12
PY2SO...2964-12- 83- A- 8
PY2BZD...1908-12- 53- A- 4

Surinam

PZ1BH...5060-23- 74- A- 8

Venezuela

YV1DP...492,048-68-2412- B-32
YV5AGD..465,690-86-1805-BC- –
YV5BTK...70,524-36- 659-AB-35

Paraguay

ZP9AY...187,380-60-1041- A-50

Out in Wyoming W7PGS turned in the leading c.w. total from the Rocky Mountain Division, almost 250-K. Warren used 3-elements on 10, 15 and 20; 2 elements on 40 and a vertical on 80 in a fine 56-hour go.

W3NJV...108- 6- 6- A- –
W3MSK (6 oprs.)
978,039-271-1203- C-96

Delaware

W3IYE...92,040-118-260- C-50
K3NHL...85,680-120-238- C-45

Southern New Jersey

W2DAJ...96,048-116-276- B-44
WA2IZS...95,940-123-260- C- –
WA2IEK...50,778- 93-184- C-29
WA2GSO...49,248- 96-171- A-45
WB2BGM..27,300- 70-133- C-40
WA2BLV...19,158- 62-103- C-20
W2DMR...16,704- 58- 96- C-22
K2OIX...15,900- 53-100 C-26
WA2QHQ..14,288- 47-102- A-26
W2QDY...11,193- 41- 91- B- –
K2PZF...7722- 39- 66- C-11
WB2APG...6660- 37- 60- C-10
W2QKJ...6510- 31- 70- B-46
W2ORA...4050- 27- 50- A- 8
WA2EIY...1425- 19- 25- A- –
W2LVW...1296- 16- 27- – –
K2OEA...478- 12- 13- A- 3
WB2EDH...297- 9- 11- A-10
WA2TTA...6- 1- 2- A- 1

Western New York

W2QWS...92,400-112-275- C-48
W2PUN...23,256- 57-136- B-27
W2SNI...13,083- 49- 89- C-56
WB2MFX..10,578- 43- 82- B-32
W2FZJ...8100- 45- 60 B-25
WA2KIZ...147- 7- 7- A- 4
K2GXI...90- 5- 6- – –

Western Pennsylvania

W3LIV...19,635- 55-119- C-33
W3ZVA...5184- 32- 54- C-24
K3ELL...4425- 25- 59- B-16
K3SIQ...4032- 28- 48- A-21

CENTRAL DIVISION

Illinois

K9CSW...50,400-100-168- C-35
W9GAI...26,427- 69-128- C-21
K9ZBI...20,412- 63-108- C-23
K9FXN...17,808- 56-106-AC-30
K9VFF...13,356- 53- 84- B- –
W9IRH...12,054- 41- 98- C-15
W9JJV...11,316- 46- 82- C-50
WA9IIJ...7740- 43- 60- A- –
W9QQN...7011- 41- 57- B- –
WA9BHH...3159- 27- 39- A-16

[1] K3MNJ, opr. [2] K3LWR, opr. [3] WA2MES, opr. [4] KØLXB, opr. [5] WA9AUM, opr. [6] WA9GZU, opr. [7] W8CQN, opr. [8] Hq. staff, not eligible for award. [9] K6DNH, opr. [10] W7WJB, opr. [11] K6LSG, opr. [12] K5ETA, opr. [13] K5ABV, opr. [14] LA9OI, opr. [15] SM5WI, opr. [16] UP2OF, opr. [17] YO5TF, opr. [18] W2YTH, opr. [19] K6SDR, opr. [20] WA6HRS, opr. [21] W1UFW, opr.

(*Continued on page 164*)

PHONE SCORES

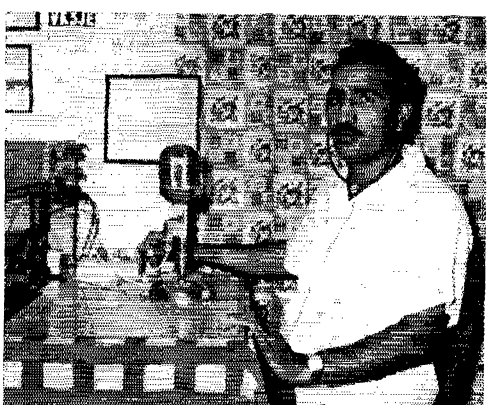
ATLANTIC DIVISION

Eastern Pennsylvania

W3BES...194,045-168-385- C-65
W3HHK...93,411-107-291- C- –
W3ALB...69,498-117-198- C-29
W3OCU...61,886 97-215- C- –
W3CCS...58,140- 85-228- C-38
W3KT/3...56,355- 85-221- C- –
W3EQA...56,050- 95-200- C-50
K3BNS...44,460- 76-195- B-35
W3NM...39,757- 83-160-BC-45
W3HA...28,620- 53-180- C-18
W3PN...28,140- 70-134- B-26
K3BGX...27,225- 75-133- B-40
W3GHD...15,408- 48-107- B- –
W3QMZ...15,264- 53- 96- B-49
K3CNN...15,141- 49-103- B-20
W3ECR...13,596- 44-103- A- 4
W3ZSS...10,881- 39- 93- C-14
K3PSW...6802- 38- 60- A-38
K3JXC...3354- 26- 43- A- –
W3QLW...3249- 19- 57- B-14
W3JSA...3240- 27- 40- A-10
W3CTJ...3150- 25- 42- A- 5
K3JGJ...1008- 16- 21- B- 6
W3QIR...672- 14- 16- B- 3
K3MNT...273- 7- 13- C- 5
W3WJD (K3JJG, W3WJD)
323,277-197-550- C-95
W3GHM (4 oprs.)
156,156-143-364- C-80
W3GRS (W3GRS, K3JCT)
119,808-128-312- C-42
W3MWC (K3s JLI LJZ, W3MWC)
103,329-129-267- C-60
W3KFQ (K3JGJ, W3KFQ)
98,988-113-292- C-63
K3KPV/3 (4 oprs.)
30,073- 61-165-AC-40
K3WFX (K3s VTO WFX)
11,808- 48- 82- C-18

Maryland-D.C.

W3ZVJ...107,463-113-317- C-53
W3ADO[1]..100,983-123-273- C- –
W3JTC...23,142- 58-133- C-25
W3AZD...12,792- 52- 82- C-16
W3MVB...11,748- 44- 89- C-15
W3MCG...11,352- 44- 88- C-14
K3CBW...4410- 30- 49-AC-19
W3DPM...504- 8- 21- C- 4



Among the more exotic c.w. Asian prefixes was that signed by Naser, 9K2AN.

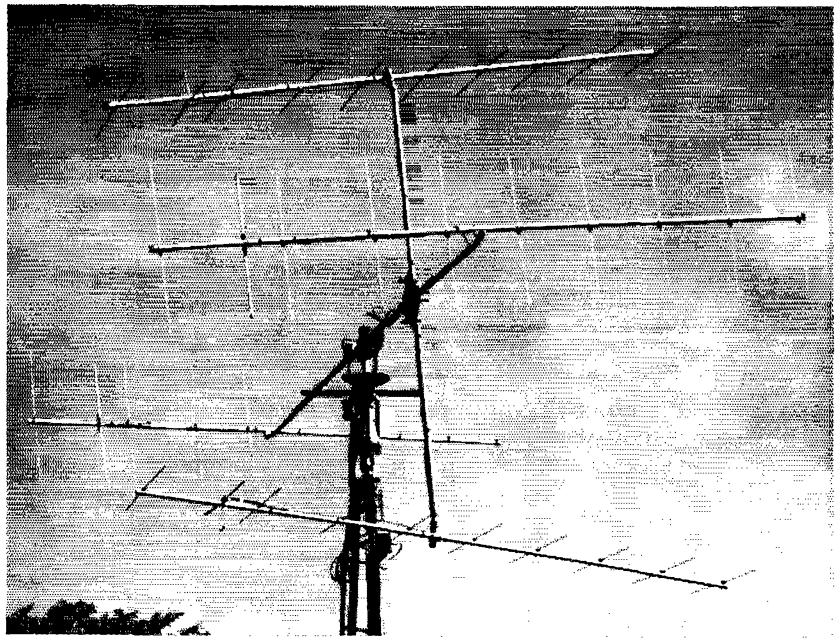


Fig. 1—Antenna system as used in tracking Oscar II. Note non-parallel mounting of opposite antennas of each pair.

A Different Satellite-Tracking Antenna System

BY JAMES D. McMECHAN, WØPFP*

and CLAYTON D. CLIFFORD, KØKPG**

THE announcement of Project Oscar offered our local radio club, the Story County Amateur Radio Club, an opportunity to participate in a worthwhile project. A committee was formed to determine what should be accomplished. The QTH of KØKPG, in the country far from man-made noise, seemed to be the best available location.

The most difficult problem was the antenna; the other problems were ones which normal ham ingenuity could solve. Taking a hint from radar and its scanning to pinpoint the location of a target, the most desirable antenna we could think of was a parabolic dish. However, not being in a spot where such items are found in local junk yards, we could see no way of obtaining a dish. Also, to be effective, the diameter would need to be 10 times the 2-meter wavelength, which would indeed be a large dish!

After much discussion we decided to see what could be done with commonly available components. We wrote to Hy-Gain, inquiring about the beam width of their Model 210 beam — 2 meters, 10 elements. They replied that at the half-power points (3 db. down) the beam width is 27 degrees in the plane of the antenna (E plane) and 40 degrees at right angles to the plane of the antenna (H plane); or, in normal horizontal mounting, 27 degrees broad in the horizontal plane and 40 degrees broad in the vertical plane. We reasoned that by mounting two of these antennas

* c/o Electrical Engineering Department, Iowa State University, Ames, Iowa.
** R.R. 2, Ames, Iowa.

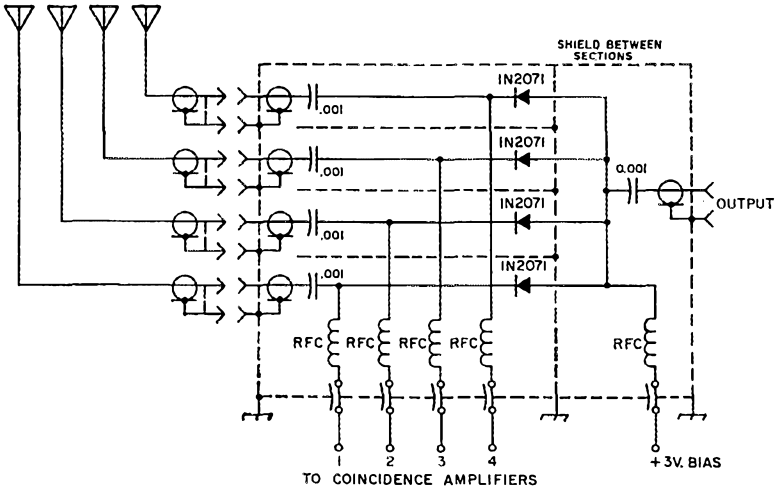


Fig. 2—Circuit diagram of the electronic switch used to connect sequentially the four antennas to the receiver.

with a 20-degree angle between the planes of the antennas, we should be able to detect the point at which the two beam patterns gave signals of equal amplitude. By turning the antennas one way, one signal would decrease while the other would increase; turning the antenna the opposite way, a similar but opposite condition would occur. The antennas are mounted as in Fig. 1, with two antennas horizontally polarized and two vertically polarized. The opposite antenna planes are displaced from each other by 20 degrees. (In the early stages, the mounting problems led us to try mounting the antennas on a single horizontal member. This antenna was used in tracking Oscar I. It worked well in azimuth, but rather poorly in elevation.)

An azimuth-elevation mount was constructed from an old Alliance Model DIR rotator and a CDR Model TR4 rotator.[1] Two selsyn generators were mounted on the rotators to provide a reasonably accurate indication of the antenna system orientation. We removed the mechanical stop and the rheostat arm from the CDR TR4 used in azimuth and made an external stop which allowed the antenna system to turn one and one-half turns. This obviates having to turn the antenna system completely around when the satellite happens to go past the normal stop, which occurs quite often in close passes. The two rotators were arranged so they could be controlled either manually or by means of two servo systems which were supposed to provide automatic tracking. It was −15 degrees F in Iowa when Oscar I went into orbit, and the servo systems did not have enough power to turn the antenna system at this temperature; however, they worked fine at 40 degrees F.

Antenna Switching

Having the four antennas looking at four points in space we could use four identical converters and receivers and compare signal strengths from each antenna, but where can you find the amount of equipment? On the other hand, if we use a switch, and switch the antennas to a converter one at a time, we can use only one converter and receiver. Such a switch is shown in Fig. 2. It is a simple electronic switch allowing each of the four antennas to be connected sequentially to the receiver. Each of the points labeled 1, 2, 3, and 4 receives a 30-volt pulse which is d.c. coupled from a cathode follower through 75 feet of unshielded cable. The time sequencing of the switching pulses is shown in Fig. 3. The 30-volt reverse bias is sufficient to keep each diode nonconducting, while the 3-volt forward bias is used to insure conduction when the switching voltage goes to zero.

Each of the antennas is connected to the switch by coaxial cables of identical lengths. Also, the center conductor of the coax going to the switch should be connected to the same side of the antenna element in matching pairs of antennas, as in a stacked array. Coax was used from the switch to a balun feeding a Q section used to match the 450-ohm open-wire feed line to the house. This line terminates in another Q section, balun and coax to the receiver.

To develop the pulses driving the switch, a 60-c.p.s. sine wave is full-wave rectified, clipped in a triode clipper, and phase-inverted to give two

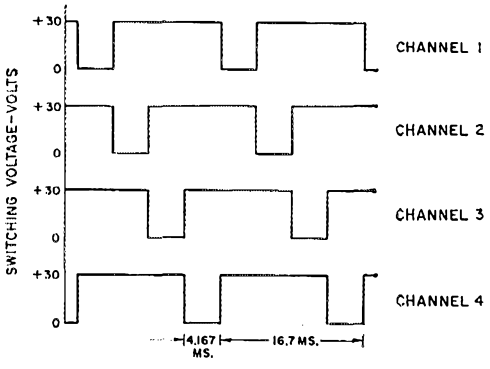


Fig. 3—Sketch showing time sequencing of pulses for Fig. 2.

[1] Similar to the system described by Kunze, "Space Age Antenna Ideas," QST, June, 1962.

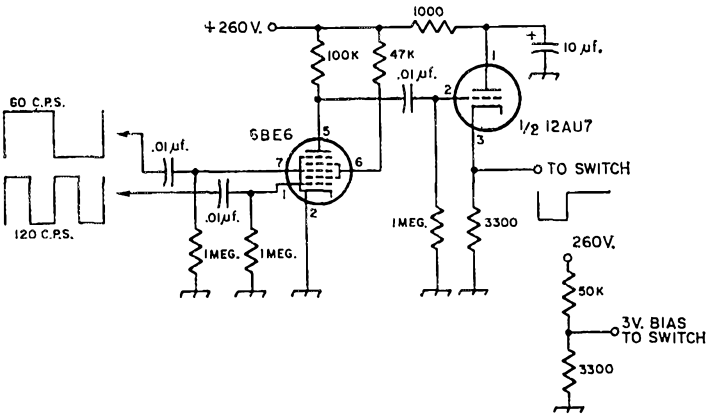


Fig. 4—Circuit diagram of coincidence amplifier and cathode follower used to generate pulses.

phases of a 120-c.p.s. square wave. We also phase-shifted a 60-c.p.s. sine wave and clipped it to obtain a 60-c.p.s. square wave which was phase-inverted to give two phases of a 60-c.p.s. square wave. The phase shift was necessary to provide time coincidence of the 60- and 120-c.p.s. square waves. By feeding one phase of the 60-c.p.s. square wave and one phase of the 120-c.p.s. square wave into a coincidence amplifier, we get a negative pulse output of 4.167 milliseconds duration. By using all four possible combinations of the two phases of the 60-c.p.s. and 120-c.p.s. square waves in four coincidence amplifiers, we obtain four different pulses each of 4.167 milliseconds duration occurring in sequence and recurring every 16.67 milliseconds. Fig. 4 is a circuit diagram of one of the coincidence amplifiers and its cathode follower. This coincidence amplifier is normally cut off and will conduct only if both signals applied to the tube are positive going. If one signal is positive and the other negative, nothing happens.

Signal Display

Interpretation of the signal from the four sequentially-switched antennas is really quite simple. We take the 455-kc. i.f. out of the receiver and apply it to the vertical amplifier of an oscilloscope. The horizontal sweep has to be 60-c.p.s. in our case and is synchronized with the switching pulses. We differentiated the 60-c.p.s. square wave and used this pulse to drive a discharge tube which developed the 60-c.p.s. horizontal sweep. Fig. 5 shows the pattern displayed on the oscilloscope when the entire tracking system is operating. In this figure, the two azimuth antennas, represented by the two signals on the left, are providing equal-amplitude signals to the receiver. This indicates that the antenna system is correctly aligned in azimuth. The two elevation signals, represented by the two signals on the right, are different in amplitude, indicating an error in the antenna system elevation. The system should be turned in elevation to cause the two elevation-signal amplitudes to become equal, similar to the pattern presented by the azimuth signals. It should be noted it is not necessary for the two azimuth signals to be equal to the two elevation signals, even when the antenna system is correctly oriented. It is only necessary that each *pair* of signals, azimuth or elevation, be equal.

Results

Using the antenna system of Fig. 1, with the azimuth antennas at right angles to the elevation antennas, we found in tracking Oscar II that we had excellent tracking information in both azimuth and elevation. The system operated even better than we hoped, to our pleasant surprise.

During the presence of sporadic *E* or auroral ionization we could hear the satellite, but we could not determine its position. Usually, in the presence of such ionization when the satellite was near the horizon, tracking was normal. Once in the presence of sporadic *E* we did not hear the satellite when we should have heard it. We were able to correlate peculiar tracking conditions with 50-Mc. E_s band openings on several occasions.

Crude measurements indicate we can track a signal within 1 or 2 degrees. The signal amplitude on the oscilloscope for an error of five degrees will be approximately twice as high in one channel as in the other.

The satellite was always heard earlier and longer on this antenna system than with another system using four conventionally-stacked 10-element Yagis at a similar height. This antenna system is mounted at a height of only 30 feet and has given excellent results.

It is quite interesting to watch the pattern on the oscilloscope during tracking, as most of the

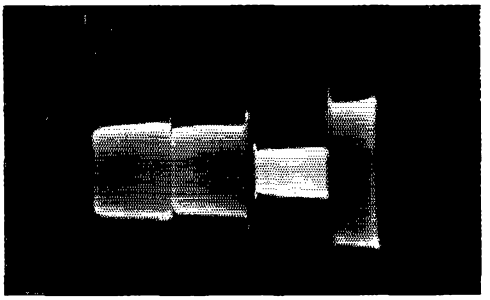


Fig. 5—The oscilloscope pattern which the operator uses during tracking.

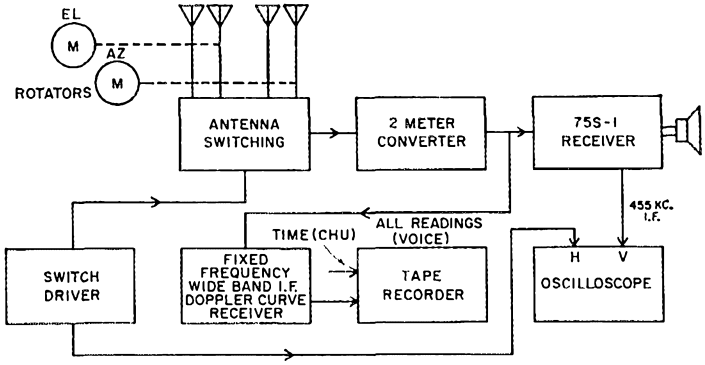


Fig. 6—Block diagram of tracking system.

time the signals are very nearly equal in amplitude in the azimuth and elevation channels, representing both vertical and horizontal polarization. However, near the end of Oscar II's lifetime the signal would sometimes be stronger in the vertically-polarized azimuth channels and at other times it would be stronger in the horizontally-polarized elevation channels. It was a toss-up which condition occurred more often. Usually one polarization would drop out for a short time, and then both polarizations would be nearly equal for the rest of the pass.

The 60-c.p.s. switching rate does not degrade the received c.w. signal of the Oscar satellite when one is tracking "on target," but there is a slight 60-c.p.s. modulation when seriously "off target." This is a good indication of tracking accuracy when a recording of the satellite pass is played back. Amplitude-modulated signals are somewhat distorted by the antenna switching. Therefore, a switching frequency above the audio-frequency range would be desirable if the antenna switch is to be used on a.m. signals.

Fig. 6 is a block diagram of our satellite-tracking setup. The 2-meter converter consists of a pair of 6CW4 Nuvistors in a series cascode feeding a 6BS8 series cascode and a 6AB4 mixer with a 12AT7 Butler oscillator.[2] The 21-Mc. converter output is fed to a Collins 75S-1 receiver which is used to determine the satellite frequency, the signal strength, and to provide the 455-kc. i.f. output with a narrow bandpass for the oscilloscope. The lower noise present in the narrow bandpass helps the tracking because the satellite signal can be seen on the oscilloscope at a lower signal level than in a wide-band receiver. The fixed-frequency receiver is a home-brew copy of a 75S-1 without the mechanical filter and with a 16-kc. i.f. response. It is tuned to provide the Doppler-shift signal for the tape recorder.

The tracking station of the Story County Amateur Radio Club may not be the simplest possible operation, but this brief description may provide ideas for others. One idea might be the use of two antennas switched by a square wave for better azimuth tracking.

The authors wish to thank Professor John Bolton of the Engineering Experiment Station, Iowa State University and Bill Smith, KØCER/K7RIA for their editorial help in preparing this article. Also, our thanks to the members of the Story County Amateur Radio Club for their help in carrying out the project. Thanks are due to WØPFP's XYL for the coffee and encouragement during the writing of this article. Finally, the tolerance of Mr. and Mrs. H. D. Clifford, during the tracking of Oscar satellite's many early morning passes, deserves the hearty thanks of all of us.

QST

[2] Similar to the converter described by Levy, "Two Meter Nuvistor Converter," 73, Aug. 1961.

Strays

Whatizzit? Rumor says it's a net for California-size butterflies, but Project Oscar's K6LFH assures us it's his new all-band mobile antenna.

Sky Temperature

Behind the Moon

BY C. R. SOMERLOCK,* W3WCP

It is common knowledge that if an antenna is pointed at the sky, it will receive radio noise. This noise is generated chiefly by our galaxy, the milky way. The intensity of the emissions will, of course, depend on the particular part of the sky at which the antenna is pointed; the "hottest" direction being that of the galactic center ($\alpha = 17^h\,43^m$, $\varphi = -28.8°$.).

If, now, one desires to communicate with some object that is silhouetted against the sky, and whose position in the sky changes, it is important to know the background sky temperature in the vicinity of that object. (The "temperature" is a measure of the radiated noise power.) In a situation such as an amateur v.h.f. moonbounce attempt, this information can make the difference between success and failure.

Method

To obtain the data, the position of the moon was determined (in equatorial coordinates) from *The American Ephemeris and Nautical Almanac* for 12 noon each day of the month of December 1965. These positions were then converted into galactic coordinates with the aid of appropriate coordinate conversion table.[1] Knowing the position of the moon in galactic coordinates allowed the background sky "temperature" to be read from a radio map of the galaxy. The particular one used was plotted by Baldwin[2] at 81 Mc. using a beamwidth of 2 by 15 degrees.

Since the moon's precession rate is small, the gross features of the data are valid for a year or so. Because the data vary in a periodic manner, similar plots can be made for any desired month in this valid period simply by shifting the abscissa of the curve by a multiple of one lunar orbital period (about 27¼ days). The values can also be extrapolated to other frequencies by the approximate formula:

$$T_x = T_o \left(\frac{f_o}{f_x}\right)^{2.7}$$

While the details of the radio sky may vary with frequency somewhat, the main features will not change.

Results

The end result of all this work is the curve shown in Fig. 1, plotting background sky temperature behind the moon for 144 Mc. Note that for about 3 days out of the month the moon is passing directly across the center of the Milky Way, resulting in very high noise temperatures in the antenna beam. As an example of what effect this can have on 2-meter moonbounce communications, consider the following case:

Bandwidth = 1 kc.
Preamplifier noise figure = 2 db.
Sky temperature = 400° K.
Received signal = −140 dbm.

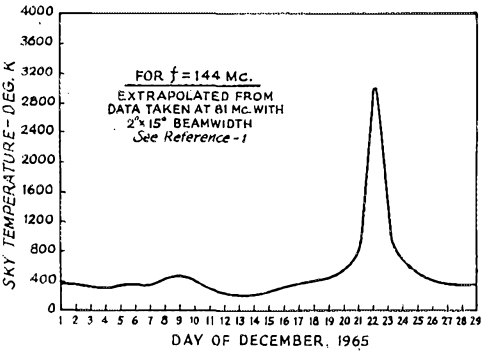


Fig. 1—Background sky temperature behind the moon, for December, 1965, for the 144-Mc. band.

The noise figure can be converted to an equivalent noise "temperature" by the relation:

$$T = 290\,(N\text{-}1) \text{ degrees Kelvin}$$

where N is the noise *factor*. The sky radiation can then be added directly to this preamp noise temperature, since they have the same effect and are in the same units. The total noise can then be converted back to more familiar units of power by:

$$\text{Noise power} = KTB$$

where: $K = 1.6\text{X}10^{-23}$ = Boltzman's Constant
T = sky temp. + pre-amp temp.
B = system bandwidth

Under these conditions, the noise power is computed as being −142 dbm, and the received signal-to-noise ratio will be:

$$S/N = +2 \text{ db.}$$

* NASA, Goddard Space Flight Center, Greenbelt, Maryland 20771.

[1] Annals of the Lund Observatory, No. 15, 16, 17.

[2] Baldwin, J. E. — "A survey of the Integrated Radio Emission at a Wavelength of 3.7M.", Monthly Notices of the Royal Astronomical Society *115*, Pages 684–689.

Table I

Frequency Conversion Factors

For a Freq. of:	Divide Values of Curve by:
50 Mc.	0.058
144	1.00
220	3.15
430	19.3
1296	380

Now consider what happens if the same system is used when the moon is in front of the galactic center. In this case:

Sky temperature = 3000° K,
so Noise power = KTB = −133 dbm.

The signal, however, is still only −140 dbm, so the received signal-to-noise ratio under these conditions has dropped to −7 db. This kind of variation can easily make the difference between success and failure.

Values for other frequencies can be determined by dividing readings from Fig. 1 by the appropriate factor from Table I, showing the relative noise strengths for various amateur bands. Clearly the problem lessens with increased frequency, and becomes negligible at 1296Mc.

Table II gives a list of approximate dates of future noise maxima which should be avoided for v.h.f. moonbounce attempts, unless the system is designed to handle these conditions. QST

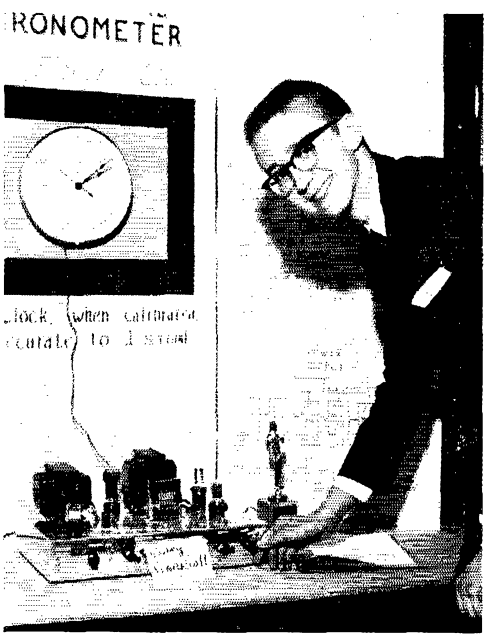
Table II

Dates of Noise Maxima
for a Moon-Tracking Antenna.

1964	1965
July 27	Jan. 1
August 23	Jan. 28
September 20	Feb. 25
October 17	March 24
November 13	April 21
December 10	May 18
	June 14
	July 11
	August 8
	September 4
	October 1
	October 29
	November 25
	December 22

Strays

An unusual mobile set-up, the property of W8CFL (the man with the electronic hat). Chick used this equipment during a hidden-transmitter hunt at Kincheloe AFB, Michigan, last June.



The piezoelectric clock or crystal chronometer shown here won the top honors in the high-school science fair and a Navy recognition at the regional science fair for its creator, Gary Garriott, WA9FMQ, of Hortonville, Wisconsin.

Oscilloscope Setups for Transmitter Testing

Looking at Modulation, Both Phone and C. W.

BY GEORGE GRAMMER,* W1DF

Earlier articles in this series concentrated on how the oscilloscope works and the ways in which various types of patterns are formed. Here are some schemes for hooking up the scope, transmitter, and one or two items of auxiliary equipment to get a look at the signal before it goes on the air. Some are also obviously useful for on-the-air monitoring.

The discussion in the two preceding articles of this series[1] should have made it plain that the primary necessity in using a scope for transmitter checking is to put a sample of the r.f. output of the transmitter directly on one set of c.r. tube deflection plates. Customarily the vertical plates are used.

By "directly on the plates" we mean either an actual direct connection to the plates, or a connection through blocking capacitors to isolate any d.c. voltages that may be in the circuits. It is rarely possible to use a scope's built-in vertical amplifier, except possibly at relatively low radio frequencies.

Unfortunately, not all of the low-cost scope kits have provisions for direct deflection-plate connections. If your scope does not have such provisions it will be necessary to modify it. The details of such a modification will vary with the actual scope circuit. In principle, it is quite simple. The deflection plates are merely disconnected from the vertical amplifier and brought out externally. The catch is that this must be done without sacrificing the spot-centering control.

Fig. 1A shows a more-or-less representative way of introducing the centering bias on the deflection plates in the regular amplifier setup. In some circuits a parallel-feed arrangement may be used, the centering voltage being fed to the deflection plates through high resistances. In such cases blocking capacitors will be placed between the amplifier-tube plates and the deflection plates.

Fig. 1B shows how the series-feed circuit of Fig. 1A can be modified. Additional resistors, R_1 and R_2, are added to isolate the deflection plates from the scope circuit so the signal input will see a high impedance. The ability to use the centering control is retained because the high resistances carry no current, and thus the centering bias continues to be applied to the deflection plates, through the dashed-line connection indicated between the two pairs of terminals. The original circuit can be restored by shifting the dashed jumpers to tie the c.r.t. to the amplifier. To isolate the source of input signal from the direct voltage on the deflection plates the signal is introduced through the blocking capacitors C_1 and C_2.

In practical scopes the circuit-changing connections frequently are made through wire jumpers between screw terminals on an insulating board. This is somewhat preferable to using a switch, since the shunt capacitance is lower. The mechanical details of mounting and wiring have

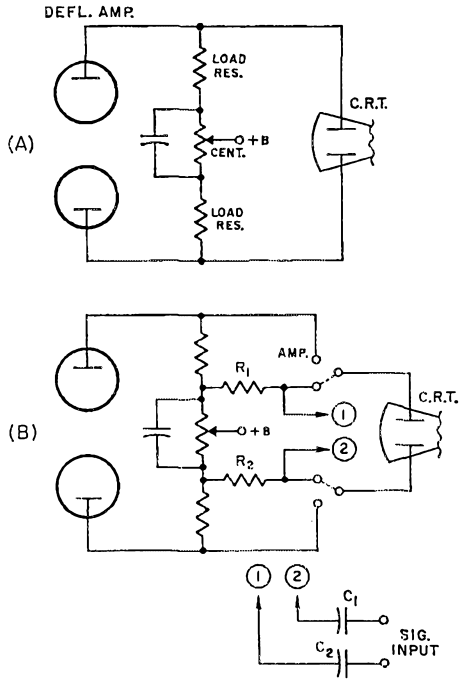


Fig. 1—Oscilloscope modification for making r.f. connections to deflection plates without going through internal amplifiers. A—Representative amplifier-c.r.t. coupling. B—Modified for alternative connection to external source. R_1 and R_2 should be 1 megohm or more, 1-watt rating. For vertical r.f. deflection C_1 and C_2 should be mica or ceramic, voltage rating according to plate voltage on vertical amplifiers; capacitance may be 500 pf. or more. For audio input to horizontal plates, C_1 and C_2 should be 0.1-μf. paper, 600 volts.

* Technical Editor, *QST*.

[1] Grammer, "The Flying Spot — III", *QST*, June, 1964, and "Sideband Scope Patterns", *QST*, August, 1964.

to be worked out for the individual scope, because different models vary in internal construction. The principal point to be observed is that the leads to the deflection plates should be as short and as well separated as possible from other wiring. This helps to keep r.f. from straying into other parts of the scope circuit.

If the centering circuit in the scope uses parallel feed, R_1 and R_2 are already built in. In that case, simply add the terminal board as shown in Fig. 1B, leaving the equivalents of R_1 and R_2 connected to the deflection plates. Connect the amplifier's blocking capacitors to the "Amp." terminals.

C_1 and C_2 can be of the order of 0.001 μf. for r.f. work. The value is not at all critical. If an audio signal is to be placed on the deflection plates larger values of capacitance must be used, for good low-frequency amplification. If R_1 and R_2 are about 1 megohm each, 0.1-μf. paper capacitors should be used for audio. The voltage to be handled is rarely more than 300 or 400 volts, so 600-volt capacitors have an ample safety factor.

Coupling the Transmitter to the Scope

With the scope itself in readiness for direct introduction of r.f. to the deflection plates, some method of sampling the r.f. output of the transmitter is the next order of business. Only a microscopic amount of r.f. power is needed for scope deflection — mainly, to supply whatever losses there may be in the system used for transferring the signal from the transmitter to the scope. However, a fairly large voltage — of the order of 50 to 100 volts r.m.s. — will be needed. The voltage required depends on the deflection sensitivity of the oscilloscope tube actually used. However, in practically any case about 100 volts r.m.s. will be sufficient.

Getting such a voltage is not difficult, even from transmitters of very low power. The best way is to use a tuned circuit loosely coupled to the transmitter's output circuit. Besides providing ample deflection voltage, this method also eliminates transmitter harmonics from the deflection voltage and offers a very convenient means for adjusting the pattern height.

Fig. 2 is a useful circuit for this purpose. The "pick-up unit" is just a pair of coax sockets

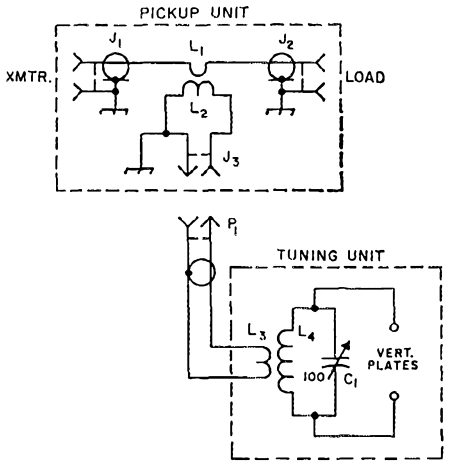
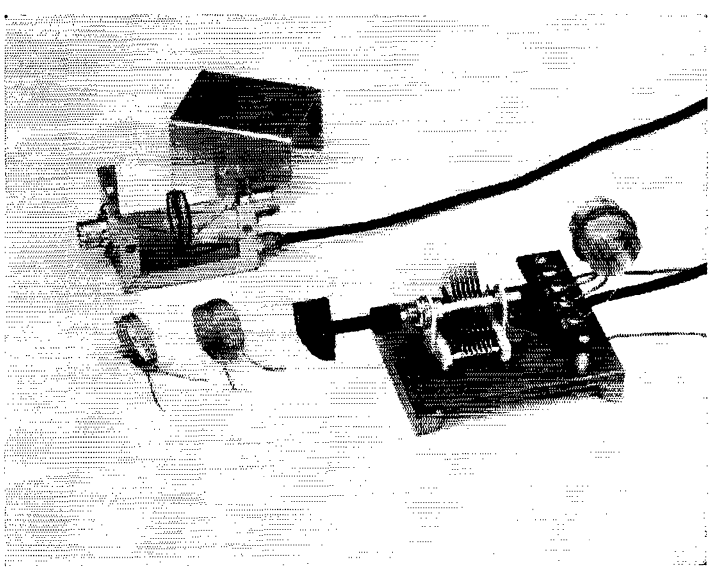


Fig. 2—R.f. pickup and tuning units for vertical plates of oscilloscope. See text for discussion of circuit constants.
C_1—100-pf. variable.
J_1, J_2—Coaxial receptacle, chassis-mounting.
J_3—Phono connector.
L_1—1 turn No. 14, 1-inch diameter (see photo).
L_2—2 turns insulated wire tightly coupled to L_1.
L_3—2 turns insulated wire, 1⅛ inch inside dia.
L_4—3.5-7 Mc.: 32 turns No. 24, diameter 1 inch, length 1 inch (B&W Miniductor 3016).
14-21 Mc.: 8 turns No. 20, 1-inch dia., 16 turns/inch (Miniductor 3015).
21-28 Mc.: 4 turns No. 20, 1-inch dia., 16 turns/inch (Miniductor 3015).
P_1—Phono plug.



R.f. of adjustable amplitude can be obtained easily and inexpensively from the output of the transmitter, using simple circuits of the type shown in this photograph. The No. 14 wire joining the two coaxial connectors is formed into a loop to which a link is coupled for transferring r.f. to the tuned circuit on the separate board. The tuned circuit can sit on the oscilloscope near the deflection plate connections.

mounted in a small Minibox, with a straight-through connection having a 1-inch loop at its center. To this is coupled a 2-turn link of insulated wire that connects to a section of small coaxial line of any convenient length. The other end of the line connects to a similar link tightly coupled to an *LC* circuit that is capable of being tuned to the operating frequency. Suggested constants are given in Fig. 2, and a simple type of construction is shown in the photograph. The tuned circuit here is mounted on a 2 x 3 inch piece of plywood, which can be set on top of the scope with short leads to the scope input terminals. To reduce stray capacitance to the scope case the wood base is elevated a little by wooden spacers. Since the tuning capacitor is single-ended, an insulating extension shaft is used for the control knob in order to reduce hand-capacitance effects. A refinement would be to use a split-stator capacitor, which would avoid hand capacitance. However, the tuning range will be narrowed, unless a physically large capacitor is used. With the 100-pf. capacitor shown it is possible to cover two adjacent bands with a single coil.

With the constants given, 100 watts in a 50-ohm matched load will easily develop a pattern that goes off the top and bottom of the c.r. tube screen. An output of as little as one watt will give a *usable* pattern height. For high power one-turn links at each end of the line connecting the pickup and tuning units should suffice. In fact, the circuit values are not at all critical. The principal requirement is that L_4C_1 tune through the operating frequency. A high-Q coil at L_4 is desirable for maximum sensitivity. The small Miniductor type coil material is quite satisfactory.

For transmitter testing this pickup assembly should be connected between the transmitter and a dummy load as shown in Fig. 3. The pickup unit can be left in the line when the antenna system is substituted for the dummy, for continuous scope monitoring. The small loop in the pickup unit will have no effect on the operation of the transmitter, and the power consumed is only a small fraction of a watt.

Test Setups

If yours is a conventional scope with amplifiers and deflection circuits, you're practically in business at this point. Wave-envelope patterns of all types can be inspected with no further equipment. For looking at voice-modulated patterns, simply give the tube a horizontal sweep of some kind — either a.c. or a low-frequency linear sweep — and inspect the pattern. Interpretation of patterns with sweeps of this type has been covered many times.[2] The main thing is that the horizontal sweep frequency should be low compared with the lowest audio frequency in the modulation. If it is too high, the pattern will be displayed just a bit at a time spread out over the entire sweep width, giving the impression of a jumble of traces sweeping across the tube at various heights. Like any jumble, such a pattern is meaningless.

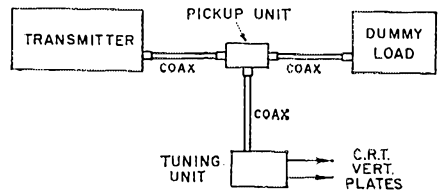


Fig. 3—R.f. setup using the pickup system of Fig. 2. Putting the transmitter r.f. signal directly on the vertical plates is basic to all types of transmitter checking with the oscilloscope. The type of display obtained them depends on the nature of the horizontal sweep signal.

With just this setup it is possible to do a fair job of checking the c.w. keying waveform. Set the linear sweep at its slowest speed and key the transmitter in a series of dots. With a little practice, you can regulate the dot speed well enough to recognize the start and stop of a dot and get a quick look at the shaping.

Trapezoidal Patterns

Checking the linearity of a phone transmitter takes a little more equipment. This requires using the same audio to drive the horizontal sweep that is used to modulate the transmitter. The audio should be taken right from the modulated stage. The simplest method is the voltage-divider circuit shown in Fig. 4. The audio voltage preferably should be applied directly to the horizontal plates. Again, if your scope does not have direct plate connections it is necessary to build them in. The circuit is the same as Fig. 1; the only difference is in the use of larger blocking capacitances. Ideally, the voltage should be applied to the deflection plates in push-pull, but this is not readily done. The deflection voltage required is about 100 volts r.m.s., again — as in the case of the r.f. deflection — at a negligible power level. R_2 and R , Fig. 4, allow adjustment of the deflection width.

The horizontal amplifiers built into most scopes will have low-enough amplitude distortion to permit satisfactory testing. Their use is convenient, since it is unnecessary to go directly into the deflection plates. Also, the audio voltage required is much smaller — of the order of a few volts, ordinarily, for full deflection. If the horizontal amplifier is to be used, the values given for this purpose under Fig. 4 should be followed. However, the amplifier may introduce a phase shift that will cause the edges of the wedge pattern to be oval-shaped.[3] With voice modulation nothing much can be done about this, but if an audio oscillator of reasonably good sine waveform is used instead of voice the phase shift can be compensated for by adding a simple phase-shift

[2] For example, *The Radio Amateur's Handbook*, and *Single Sideband for the Radio Amateur*, in addition to the references in Footnote 1. See also "How to Run Your Linear", *QST*, November, 1962.

[3] Page 34, June 1964 *QST*.

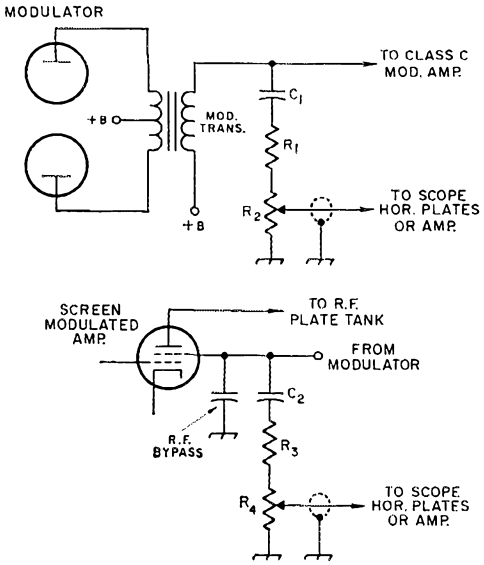


Fig. 4—Audio take-off for amplitude-modulation checking. The method is the same for various modulation systems; only the values vary. If the audio signal is to be applied directly to the horizontal deflection plates, R_2 and R_4 should be of the order of 0.25 megohm. The total resistance of the voltage divider should be equal to 0.25 megohm for each 100 volts of d.c. plate voltage on the modulated r.f. amplifier in the case of plate modulation, or for each 100 volts of d.c. screen voltage in the case of screen modulation. Quarter-megohm ½-watt resistors can be connected in series to make up the required value. The values of C_1 and C_2 depend on the total resistance of R_1 and R_2 (or R_3 and R_4) in series. For 0.25 megohm, C_1 or C_2 should be at least 0.05 μf. For 1 megohm, a suitable value is 0.02 μf. A value of 0.005 μf. is satisfactory for resistances of 2.5 megohms or more. The capacitor voltage rating should be at least twice the d.c. voltage on the tube element to which it connects. For feeding the audio signal to a horizontal amplifier in the oscilloscope, R_2 or R_4 may be reduced to 5000 or 10,000 ohms. The total divider resistance and values of C_1 and C_2 are unchanged.

network as shown in Fig. 5. The constants given are suitable for an audio frequency in the vicinity of 1000 c.p.s., but will work over a 2 to 1 frequency range. For much lower frequencies a larger capacitance should be used (in inverse proportion to frequency); for much higher frequencies, a smaller value.

The phase-shift network goes between the audio source (the modulator) and the horizontal-amplifier input terminals of the scope. Which of the two circuits to use must be determined by trial; if it doesn't compensate the first way tried, interchange the resistor and capacitor. Adjustment of R_1 will shift the phase enough, in nearly all cases, to make the pattern edges go from an oval to a line. In addition to being frequency-sensitive — which is why the circuit is usable only with a single tone — the circuit also suffers from the fact that the amplitude of the output from the network changes with adjustment of R_1. Thus it is necessary to adjust the horizontal-amplifier gain, or the input-signal amplitude, concurrently with the phasing adjustment in order to maintain a desired pattern width. These disadvantages are minor compared with the desirability of single-line pattern edges.

S.S.B. Patterns

Most sideband transmitters lend themselves well to checking only by the use of the wave-envelope pattern. All this requires, for voice modulation, is the scope and the r.f. setup of Fig. 3. The principal thing that can be determined, without an audio oscillator, is the peak-flattening point.[4]

A better look at linearity can be obtained with a good audio oscillator although, as detailed earlier in this series, critical interpretation is difficult; it depends on how clean a sine wave the audio generator gives and how low the distortion is in the transmitter's audio circuits. The r.f. setup is the same as in Fig. 3, with the addition of the audio connections of Fig. 6. The purpose of these connections is simply to permit synchronizing the scope's horizontal sweep circuit at some submultiple of the tone frequency so a few modulation cycles will be displayed. (The same setup can be used for single-tone testing of an a.m. transmitter).

With single-tone input and suppressed carrier, the pattern should resemble an unmodulated carrier. If there is ripple on the carrier it can be interpreted as described earlier.[5] If the transmitter has provision for inserting a fairly husky carrier, as most do, the two-tone pattern can be obtained. To get it, watch the pattern while increasing the carrier insertion, after having

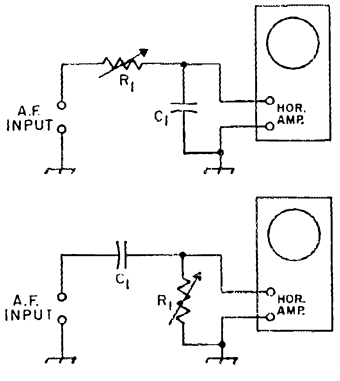


Fig. 5—Simple phase-correction circuits. For a frequency of approximately 1000 c.p.s. C_1 may be 0.002 μf. in both circuits. R_1 is a 1-megohm variable resistor, audio taper preferred. To prevent hum pickup, shielded wire should be used between the audio source and the network, and the latter should be connected to the scope by very short leads.

[4] See references in Footnote 2.

[5] Fig. 4, page 31, August 1964 *QST*.

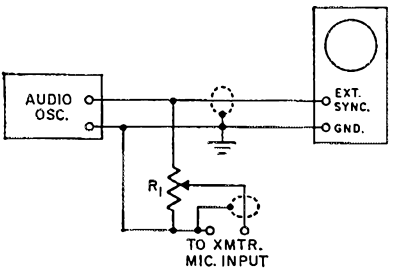


Fig. 6—Audio oscillator to scope connections for synchronizing a linear sweep with single-tone modulation. R_1 is for independent adjustment of the audio level at the transmitter's microphone input jack. An audio-taper control having a value of 5000 or 10,000 ohms will be satisfactory for use with audio oscillators having moderately-low output impedance. The control may not be necessary in all cases. Shielded wiring is desirable to prevent hum pickup. The resistor may also need to be shielded if hum shows up in the transmitter's output.

set the single-tone s.s.b. pattern to about half the maximum height that the transmitter is capable of producing by adjustment of the audio gain. As the carrier insertion is increased, the modulation pattern will form. Eventually, when the carrier and sideband have equal amplitudes, the typical two-tone pattern of Fig. 2D in the August article will be displayed. If there is flattening at the tops of the waveform the transmitter is being overdriven; the audio gain should be reduced and the carrier insertion reduced to correspond, until the flattening disappears. The transmitter is then being driven to its maximum linear level. Linearity throughout the modulation cycle can be estimated by observing how closely the waveform resembles half sine waves on each side of the horizontal axis.

The problem of generating a bow-tie pattern for a more accurate check on linearity was discussed in the August article. It can be obtained with phasing-type transmitters that are capable of transmitting a double-sideband suppressed-carrier signal, but not with a filter-type transmitter that has no provision for bypassing the filter. For a phasing transmitter, use Fig. 3 in conjunction with the audio connections of Fig. 7, and set the transmitter controls for double sideband with suppressed carrier. The phase shifter circuit is that of Fig. 5. It should be adjusted to give clean line edges, rather than ellipses, on the bow-tie pattern.

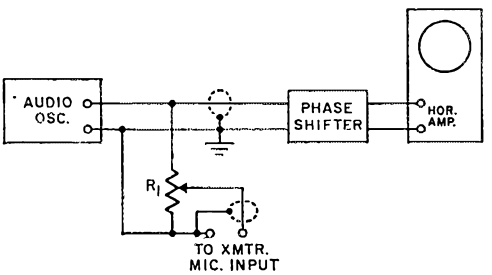


Fig. 7—Audio connections for generating a bow-tie pattern with phasing-type s.s.b. transmitters capable of producing a double-sideband suppressed-carrier signal from single-tone modulation. Except for the addition of the phase-adjustment circuit (Fig. 5) the setup is the same as in Fig. 6 and the same considerations hold.

C. W. Keying

A good idea of the keying waveshape in a c.w. transmitter can be secured simply by pounding out a series of dots by hand, as mentioned earlier. However, a much more satisfactory way of getting keying pictures is to make use of an electronic keyer. The keyer not only saves labor but will generate uniform dots indefinitely — just what is needed for synchronizing the scope's linear sweep so the pattern will be stationary. There is a further advantage in that the dots can be generated at high speed. This is a necessity if the scope's lowest sweep speed is too high to show one complete dot sent at ordinary hand keying speed.

As in the other cases, the r.f. setup for c.w. checks is that of Fig. 3. The electronic keyer should be tied into the scope's external synchro-

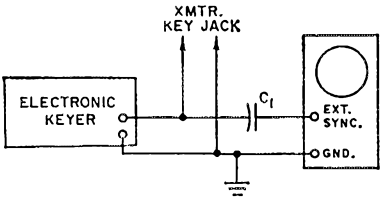


Fig. 8—Using an electronic keyer for obtaining keying-waveshape patterns. Pulses from the keyer are applied to the oscilloscope's external-sync terminal through C_1, a capacitance of the order of 0.01 μf., to lock the linear sweep at slow speed.

nizing circuits as shown in Fig. 8. C_1 is a blocking capacitor for isolating any d.c. voltage that may be in the transmitter's keying circuits; the value of this capacitor is not critical, although it should be large enough to let a fairly solid pulse get through to the scope's sync circuit.

Most scopes seem to have linear sweep circuits that are rated down to about 15 c.p.s. This frequency represents rather fast keying. The simplest thing is to set the sweep frequency at the lowest possible value and then increase the electronic-keyer dot speed until the picture is locked on one dot. This may require a dot rate equivalent to a keying speed of 40 to 50 words per minute.

While such a setup will give a good qualitative check of the keying waveshape, it is difficult to get quantitative information on the rise and decay times of the keyed characters unless the exact keying speed is known and the linearity of the sweep is very good. The latter is not too likely to be the case. However, the display is excellent for determining such things as the effect of power-supply regulation on the keyed character,

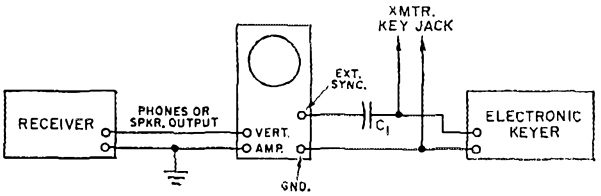


Fig. 9—Setup for timing rise and decay times in keying waveforms. See text for details.

whether or not there are "spikes" or other transients on make and break, and the effects of adjustment of shaping circuits.

If more definite information is wanted the setup of Fig. 9 can be used. This is the same as Fig. 8, but instead of using the r.f. pickup of Fig. 3 the output of a receiver is connected to the vertical amplifier in the scope. The receiver is tuned to the transmitting frequency with the beat-frequency oscillator on, and should pick up enough signal with its antenna disconnected. In any event, the r.f. input to the receiver must be reduced below the point where there is any possibility of overload. The r.f. and i.f. gain should be set at a point where the signal is of moderate strength at the detector. The broadest selectivity position should be used, and the automatic-gain-control circuit should be disabled. With the signal tuned in the middle of the receiver's pass band, the b.f.o. should be set to give a beat tone as close as possible to 1000 c.p.s. (The tone can be checked quite accurately by tuning in CHU with the b.f.o. off. The time signals from CHU are modulated at 1000 cycles. This is also the background tone frequency heard on the WWV transmissions during the time when the "sputtering" signal is transmitted — the third minute in all but one five-minute period during the hour — and in the Morse code transmissions.) Each cycle of the beat frequency is then 1 millisecond long, so the number of complete cycles appearing in the scope pattern during the rise and decay times gives an accurate measure of these times.

High selectivity should not be used in the receiver in this sort of test, because narrow bandwidth may add to the shaping that is actually on the transmitted signal. However, bandwidths of two or three kilocycles will not affect it, unless the signal is much too "clicky" to be considered good keying anyhow.

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This article has not attempted to cover all the possible ways in which the scope can be used to advantage in transmitter testing. The possibilities are too numerous. The object here has been to outline elementary, but practical, methods for making the more important tests on c.w. and phone transmitters. The amateur who has an understanding of the way in which scope patterns are generated, as outlined in the earlier articles in this series, not only will soon find himself getting more than his money's worth out of his scope, but will have little difficulty in devising his own test setups for handling special situations. The more the scope is used, the more uses are found for it. QST

October 1939

. . . With the clouds of World War II gathering on the horizon, the editorial in *QST* for October 1939 stressed the necessity of neutrality in amateur radio operations. A four-point system of recommendations for neutrality was suggested for amateur operating. Also mentioned in the October editorial was the passing of the "S.F." system, Standard Frequency Service. This was a League service that provided accurate 100-kc. markers at intervals throughout several amateur bands for the purpose of calibrating frequency meters and receivers.

. . . An adventure story, "The *Cruise of the 'Pang Jin'*", by VS6BF, gave details of operating amateur radio aboard a Chinese junk.

. . . A new type of circuit for chopping noise peaks was described by Dana Bacon, W1BZR. The circuit, a series noise limiter, was to become extremely popular for reducing QRM from automobile ignition.

. . . Other technical articles included one by a W1JPE which presented some pros and cons on the uses of the infinite impedance detector. Don Mix described a compact 250-watt rig which used a single 75T in the final, and an interesting method of setting up direction marks for beam antennas using astronomical guides was presented by W6JPQ.

. . . As today, the oscilloscope was an important test tool in 1939, and W1LJI's article on analyzing some common troubles with the oscilloscope gave text, diagrams and photographs to show modulation percentage, audio distortion, linearity, and other conditions, good and bad, that commonly exist in phone transmitters. QST

Strays

A **License Expiration Notice Service** is offered by the Foundation for Amateur Radio, an organization of clubs in the Washington, D. C. area. All you need do is address a postal card (no other form accepted) to yourself, write any message you want to send to yourself on the message side of the card, and write across the top of the message side of the card (when placed horizontally) the month and year when you want the card mailed. Put this in an envelope and send it to Joan Machinchick, K3KBI, Lake Drive, Cape St.Clair, RFD, Annapolis, Md. 21401.

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On the New York Stock Exchange "big board," the ticker symbol for the Communication Satellite Co. stock is "CQ." An item on the financial pages of the *New York Times* on Aug. 21 says that one reason this symbol was chosen is because it is the signal used by radio amateurs to invite other amateurs to call them. — *K1GWR*

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KSGOW would like to hear from other hams who are also Justice of the Peace.

The Hard Way

BY JOHN G. TROSTER,* W6ISQ

ALL right, gentlemen. Now is there any new information from the Commission?"

"Yes sir . . . and it's bad, bad indeed. Seems like that so-called Novice License won't get our man what he needs. All the red tape . . . ahhhh . . . sorry . . . regulations state that those Novices are only allowed to send with Morris buzzer code on their radios. And even then they can send only inside real narrow divisions on their frequency dials."

"You mean to tell us they won't let law-abiding United States citizens talk over the public domain air waves with their own voices? Why, that's in direct violation of every constitutional right from the Magna Carta to . . . to . . . ahhh . . ."

"Oh no . . . they can talk, but not on any good place on the dial where anybody can hear 'em past a mile or two. Very poor audience. Poor coverage."

"It says right there in the Constitutional Amendments . . . or Articles . . . somewhere in there . . ."

"I look at it this way, gentlemen. There's more at stake than our just getting *any* old radio license. It has to be the *right* license! Right? Remember *he* passed a full-length, regulation-sized Commission exam . . . fast Morris code and all. Right? OK, so we . . . errr . . . our man will just have to pass exactly the same full, big, regular, amateur radio test too. Right?"

"Right. And . . . ahhhhh . . . how's he doing?"

"Don't worry. Doin' fine. Old Navy man, you know, so he knows a lot about this stuff already. Just a little faster Morris code now: and then polish up on a few more radio questions and doodles than we'd originally planned on . . . and . . . ppfffsssstttt . . . in!"

"Say, maybe they'd let him copy old Navy blinker lights instead of the buzzer code."

"There oughta be a law . . . or loophole! Maybe if we . . ."

"Are you fellas *sure* all this is worth the time?"

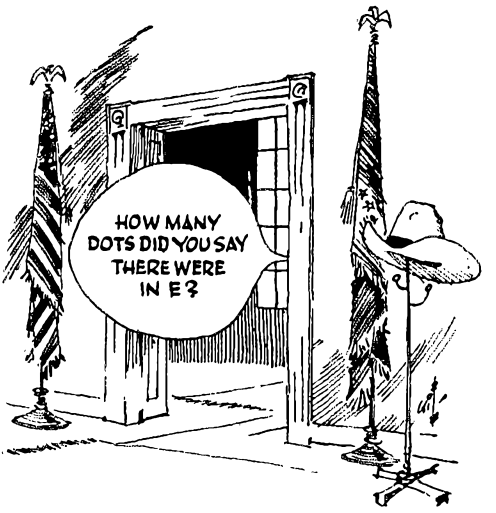
"Coooooommme ooooonnnn. Like I said, if *he* passed it, our man's gotta do it the same way, and get the same kind of license. That Novice business is out."

"I believe you gentlemen would be interested to learn that we have been informed by our usually reliable sources . . ."

"Ugh . . . oh, no . . . again? . . ."

". . . that *he* flunked the buzzer code exam twice! I wonder if you can . . . grasp . . . the . . . full significance . . . of . . ."

"Yeeeaaaahhh . . . say . . . if our man could pass it the *first* time . . . saaayyy . . . we could get some buzzer code tutor going full time. And get some of those midget sets and keep



flashing . . . err . . . buzzing code at him all day. Play records under his pillow . . ."

"Right! But what about those radio questions and doodles about how radios work and stuff?"

"Well, they told us down there that he'll just plain have to do it the hard way like any other citizen . . . he'll just have to sit down and memorize every single question and doodle in the whole book."

"Well, maybe we could hire him a memory expert . . . or hypnotist . . . or . . ."

"I still say it's a waste of time. He'd do better shakin' hands at an opposition rally than buzzin' around playing word games with an expert."

"Look, friends. Our man *has* to do it the same hard way too. People look at things like that. The old 'up-from-the-ranks', ahhh . . . the common touch. You know! It's important at a time like this."

"Sure, and if our man could pass the code test the *first* time . . . well, the implications . . ."

"Hear, hear . . . hear, hear . . . buzz, buzz . . . haw . . ."

"If you please. No levity for five weeks yet."

"But I just can't see why it's so necessary to tie up our man full time with a buzzer and ouija board."

"Look, for the last time . . . can't you see there's absolutely *no* alternative? Our man *has* to go through with it the same hard way."

"Mr. Chairman . . . ahhh . . . maybe we should put it this way. Just how else can our man get equal air time on twenty-meter phone?"

QST

Strays

Is VE1LG the oldest active Canadian ham? He's 88.

* 45 Laurel Avenue, Atherton, Calif.

The Picometer

A Direct-Reading Capacitance Meter of Simple Design

BY DOUGLAS A. BLAKESLEE, WIKLK

Technical Assistant, *QST*.

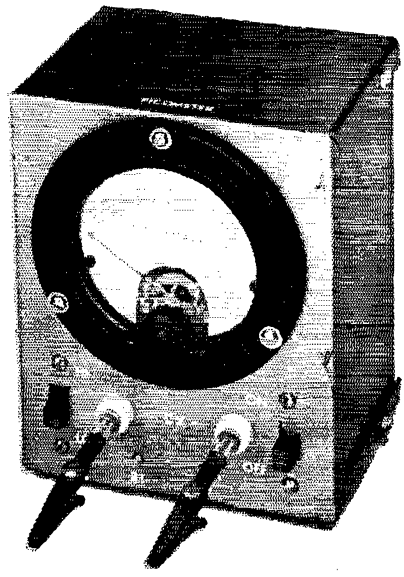
THE Picometer is a simple, direct-reading capacitance meter that will be a welcome addition to your shack if you are "Parts Plutocrat"[1] or an avid surplus hound. When trying to make use of capacitors taken from an old TV set or purchased at the local surplus house, you may wonder if you have found such a bargain after all. Some capacitors are marked with only a manufacturer's code number, and others are not marked at all. Worst of all are postage-stamp micas with the colored dot code. There are some six codes in use, and when you try to find the value by checking the color code on the capacitor with those in the book, the arrow usually seems to be going in the wrong direction, or there is one dot too many. The best way to save your hair is with a capacitance meter.

Capacitance Meters

There are several types of capacitance-measuring devices in use, including various types of bridges. These require the manipulation of many controls to check one capacitor, and their construction requires a lot of expensive precision parts. For small values of capacitance, your grid-dip meter will serve, by indicating the frequency at which the unknown capacitor will resonate with a known inductance. A little calculation will tell the capacitance, but this method is much too slow for a number of capacitors.[2] What is needed is some sort of direct-reading device with reasonable accuracy.

[1] Haywood, "The Spare-Parts Plutocrat," *QST*, July, 1961.

[2] See the Measurements chapter of *The Radio Amateur's Handbook*.



The completed Picometer which will test capacitor values from 10-pf. to 0.01-μf. Below the meter are the range switch, the clips to hold the capacitor under test, and the power switch. Below the clips are the two range adjustments.

A simple type of direct-reading capacitance meter is one having a response in some proportion to reactance. In this type of meter a signal of known frequency is passed through the unknown capacitor, and the amount of signal passed is measured. Each value of capacitor will present a different value of reactance to the signal frequency, and thus pass a different amount of the signal. The Picometer is a simple reactance-difference type of capacitance meter.

Circuit Details

The Picometer circuit is shown in Fig. 1. A 2N370 (Q_1) is used in a modified Pierce oscillator as the crystal-controlled signal source. A second 2N370 is a buffer amplifier to provide some gain and isolation between the oscillator and the load. The crystal is a surplus FT-241 type, with a frequency of 492.59 kc. (marked Channel 66, 26.6 Mc.). Any of the FT-241 crystals in the range 480 to 517 kc. (Channels 60–79) should work equally well with no change in basic calibration. These crystals are still available through many surplus dealers.[3]

The 2N370 transistors are directly interchangeable with the 2N371, 2N372, 2N373, 2N374, 2N384, 2N1178, 2N1179, GE-9, and JR30X, so use what is available in your area.

The signal from Q_2 is passed through the unknown capacitor and rectified by diodes CR_1 and CR_2. The output from the diodes is measured by M_1, with R_1 and R_2 to provide scale adjustments for the high and low ranges. M_1, a 0-1 milliammeter, is the single expensive item in the Picometer. You may be able to obtain a suitable

[3] If you have difficulty locating one, try Texas Crystals, who will grind FT-241s to your specs.

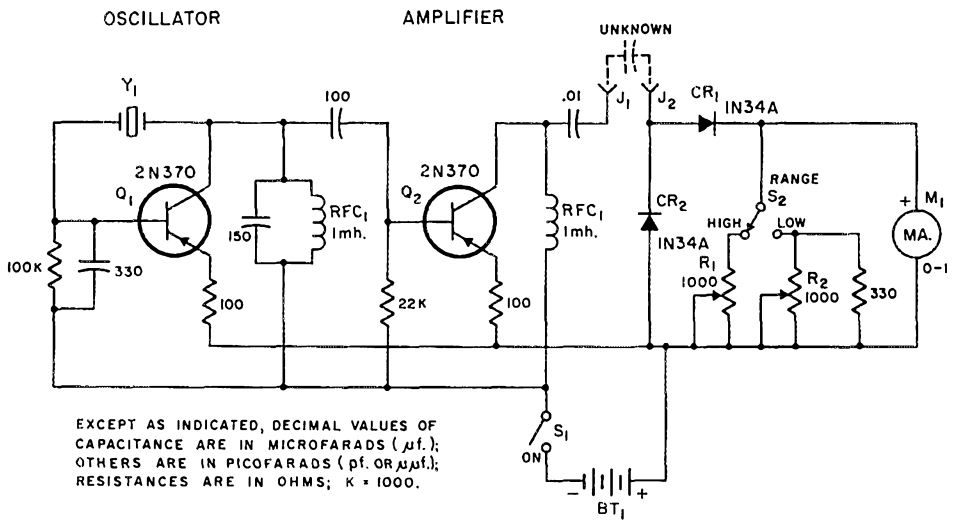


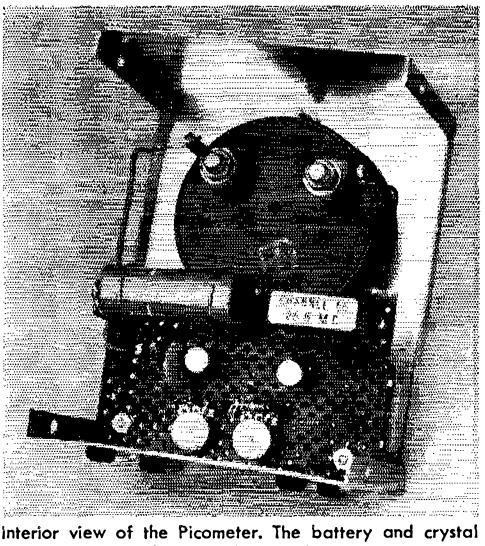
Fig. 1—Schematic diagram and parts information for the Picometer. Capacitors are ceramic. Resistors are ¼-watt composition.

BT_1—9-volt battery (Eveready 216).
CR_1, CR_2—1N34A diodes.
J_1, J_2—Insulated banana jacks.
M_1—0-1-ma. d.c. milliammeter, 3½-inch diam. (see text).
Q_1, Q_2—2N370 (see text).
R_1, R_2—1000-ohm miniature control (Mallory MLC13L).
RFC_1, RFC_2—1-mh. subminiature r.f. choke (Millen J300).
S_1—S.p.s.t. contact slide switch.
S_2—S.p.d.t. contact slide switch.
Y_1—FT-241 crystal, 492.59 kc. (see text).

meter at radio-club auctions or the surplus houses. It need not be 0-1 ma., as any *more* sensitive movement can be used with appropriate shunts to give 0-1-ma. scale.[4] The unit in the photograph has a surplus 3½-inch round meter, which has a large-enough scale to be easily read at a glance. The calibration is given in Fig. 2, and if yours is 3½-inch meter the scale may be cut out and pasted directly to the meter face.[5]

[4] For more information on meter shunts see the Measurements chapter in *The Radio Amateur's Handbook*.

[5] If you do not wish to cut your *QST*, send a self-addressed stamped envelope to ARRL for a print of Fig. 2.



Interior view of the Picometer. The battery and crystal are at the top of the pegboard, the two transistors in the center, and the two range adjustment controls at the bottom.

If you have a v.o.m. with a 0-1-ma. scale, it can be used in place of a built-in meter by installing a pair of pin jacks instead of the meter in Fig. 1. With the v.o.m. you won't have the direct-reading feature, so it will be necessary to make an auxiliary chart.

A 9-volt transistor radio battery is used for power, and it should last several hundred hours as the current drain is quite small.

Construction

Building the unit is straightforward. A 4 × 5 × 3-inch Minibox is used, although a smaller box may be desirable when a v.o.m. is used as the indicator. The oscillator and amplifier are constructed on a 3¾ × 2¼-inch section of electronic pegboard (available from Lafayette Radio). The parts placement is not critical. The crystal and battery are mounted at the top of the board, and the two variable resistors, R_1 and R_2, are mouted at the bottom. The board is held in place with two angle-brackets made from a strip of ½-inch wide aluminum.

R_1 and R_2 are the miniature Mallory MCL series, which are inexpensive and quite small. The "Low" range control, R_2, is shunted by a resistor to make adjustment easier. R_1 and R_2 are mounted so the shafts just extend through the front of the Minibox. The MCL series have screwdriver slots on the ends of the shafts, so adjusting is easy. The two slide switches are mounted on either side of the Minibox at the bottom. Between the two switches are two banana jacks for the unknown capacitor. Two alligator clips were soldered to banana plugs to make low-capacitance clips to hold the unknown capacitor under test.

Adjustment and Use

If you use the calibrated scale provided, you will need only a 100-pf. and a 0.01-μf. capacitor to calibrate the instrument. It is recommended that you purchase two one per cent capacitors and keep them handy to check the calibration. To calibrate, first turn both R_1 and R_2 fully counter-clockwise. Then put the range switch on "High" and turn the unit on. With the 0.01-μf. capacitor in the test clips, adjust R_1 for 0.01 μf. on the scale (full-scale reading). Then switch to the "Low" range and place the 100-pf. capacitor in the test clips. Adjust R_2 for 100 pf. or full-scale reading. This completes calibration. It is a good idea to check the calibration with the two one per cent capacitors before using.

Those using v.o.m.s as indicators can calibrate their instruments with a handful of capacitors across the range, or a decade capacitor. The best way would be to make a graph of the 0-1-ma. range *vs.* the capacitance value. Those who don't use the provided scale may also use this method to calibrate any 0-1-ma. meter. By looking at Fig. 2 you will get a general idea of where different values of capacitance will appear on the scale.

You cannot check the actual values of capacitors over 0.01 μf. on the Picometer, but you can get a good idea whether they are working. Any value over 0.01 μf. will read full scale on the "High" range. If it does not, the capacitor is probably no good. An ohmmeter can be used for checking electrolytics and for capacitor shorts. QST

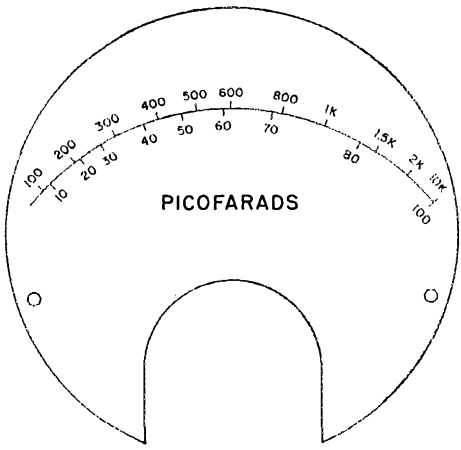


Fig. 2—This Picometer scale may be cut out and pasted directly to a 3½-inch meter scale.

• New Apparatus

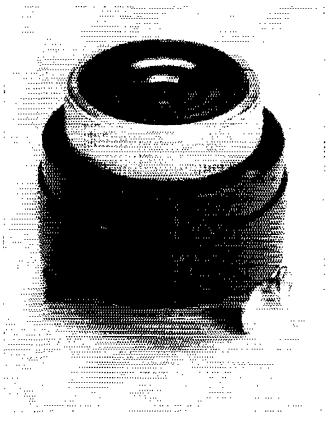
Sonalert—Audible Signal Generator

With a little imagination, the device shown in the photograph could be applied in many interesting and useful ways to amateur radio. The gadget is a minature audible tone generator that requires very little power to operate. The one shown here takes only 6 volts d.c. at 3 ma. to give a healthy blast of sound that can easily be heard even in a relatively noisy location.

Some typical applications include use as a code practice oscillator, power failure alarm or an overload alarm. With the device connected to a crystal-diode rectifier and r.f. pick-up loop, placing the loop near the tank circuit of a c.w. transmitter will give enough energy to power the Sonalert as a c.w. monitor. The nice thing about this unit is the complete lack of r.f. interference usually associated with mechanical noise-making devices.

Sonalert is actually a transistor oscillator driving a ceramic transducer, which determines the frequency of oscillation. The ceramic transducer is mounted in an air chamber designed to provide effective air coupling, thus permitting the electrical energy to be converted to sound. The Sonalert shown in the photograph gave a quasi-musical tone of about 2800 cycles per second.

The tiny oscillator measures only $1\frac{11}{16}$ inches in diameter and is $1\frac{5}{8}$ inches deep. It can easily be mounted on any panel up to ¼ inches thick by unscrewing the threaded knurled ring visible in the photograph and then inserting the Sonalert in a $1\frac{9}{64}$ inch diameter hole. The ring is then tightened down against the panel.



Electrical connections to the Sonalert are made to two screw terminals at the rear of the unit. The model SC-628 shown will operate in the d.c. voltage range of 6 to 28 volts. Other models are available for a.c. operation with the same voltage spread. One model is designed for 105 to 120 volts a.c. operation.

The Sonalert weighs about $1\frac{3}{4}$ oz. — *R. L. C.*

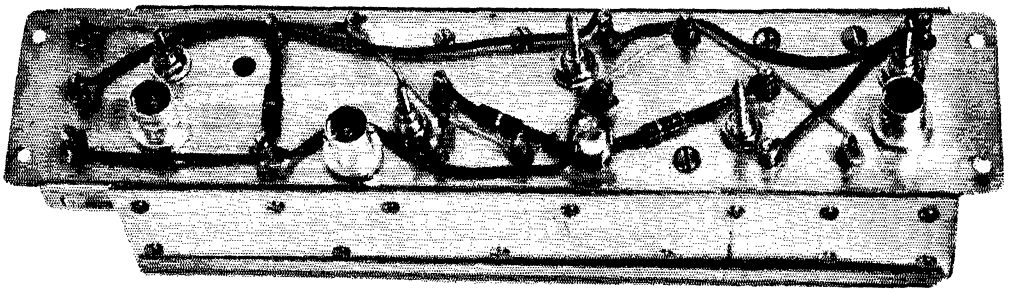


Fig. 1—The 432-Mc. converter completely assembled. The three BNC connectors are for antenna input, right, oscillator injection, left center, and i.f. output, left. The tuning slug at the left is for the 28-Mc. i.f. output coil. Other adjustment screws are for the pistons in the trimmer capacitors.

A Lumped-Constant Converter Front End for 432 Mc.

By NORMAN J. FOOT,* WA9HUV

Using Pi-Network Circuitry for Improved U.H.F. Receiver Performance

GONE are the days of the simple receiver for 420 Mc. Except for purely local communication, sophisticated and often expensive receiving gear is employed almost universally. There is almost no commercially-made equipment for 432 presently available, and while this may make new contacts hard to come by it does tend to keep this band a fine field for the experimentally-inclined amateur.

Good reception on 432 is usually achieved only after a considerable do-it-yourself program. I wanted a receiver front end that would be compact in size, and simple enough to be put together with nothing more elaborate than tin shears, an electric drill and a soldering iron. This ruled out fancy trough lines, cavities and blowers, as well as access to a well-equipped machine shop. What emerged was a practical and reasonably economical 420–450-Mc. amplifier with excellent performance. Stage gains of 12 db. were realized, these being raised to 16 to 20 db. with the addition of a "Q multiplier." Now we're really living, I thought, so I set out to build a complete converter.

Front-End Layout

Only the r.f. amplifiers and mixer will be discussed in detail here. It should be sufficient to mention that 404-Mc. energy from a separate module is fed over a short length of coax to the mixer. The intermediate frequency starts at 26 Mc. For good performance, the output of the injection stages should be at least 20 milliwatts.

The amplifier chassis, shields and cover plates were made entirely of .032-inch half-hard brass, using only ordinary hand tools. After the metal parts were prepared they were silver-plated, to make for easy soldering and improved appearance. Three 8058 grounded-grid r.f. stages are

*293 East Madison Ave., Elmhurst, Ill.

One challenging aspect of amateur work in the 420-Mc. band is that techniques employed have not become so standardized that there is only one way to do a given job. Here is a front-end design for 432 Mc. that is "different." Knowing u.h.f. receiver men may question the author's use of three r.f. stages, but they will respect his ability to use such high gain while retaining stability. If you've fought oscillation in even a single-stage amplifier, there'll be some helpful tips for you here.

used in tandem, followed by a 7587 tetrode mixer. Three stages may be over-doing it a bit, but a good feeling comes from the assurance that any mixer noise will be thoroughly buried by the amplified noise coming through from the antenna stage. In view of the front-end gain, it can be assumed that any type of mixer would have worked equally well.

The four stages are built into a module only 7 by 1½ by 1⅞ inches. Metal parts needed include a shallow chassis, end and shield plates, side plates and a bottom cover. The chassis has extensions on each end, so the unit can be mounted in a rectangular hole in the main chassis. Power is brought into the module on feed-through capacitors, visible at the left end of Figs. 1 and 2.

Interconnecting leads between sections of the module are brought up on feed-through capacitors to the top side of the converter chassis. This type of construction does away with running wires through shield partitions, a must if one would achieve stability in high-gain amplifiers. Decoupling resistors, tuning controls and the three BNC connectors are all on the top surface, as seen in Fig. 1.

Looking at the interior view, Fig. 2, it will be seen that there are five compartments. From right to left are the antenna input section, the first interstage coupling circuit, the second interstage, the mixer input and mixer output circuits. The Nuvistor sockets are mounted on the horizontal centerlines of the partitions, but staggered to allow room for the coils and tuning capacitors. Small Teflon standoffs support junctions of resistors and r.f. chokes inside the modules, as may be seen from the closeup view of the second and third compartments, Fig. 4.

The feed-through capacitors were soldered in after silver plating was completed, using a blunt-tipped 50-watt iron from inside the chassis. Wiring was done before the side plates were attached. The case is held together with 2-56 screws and nuts.

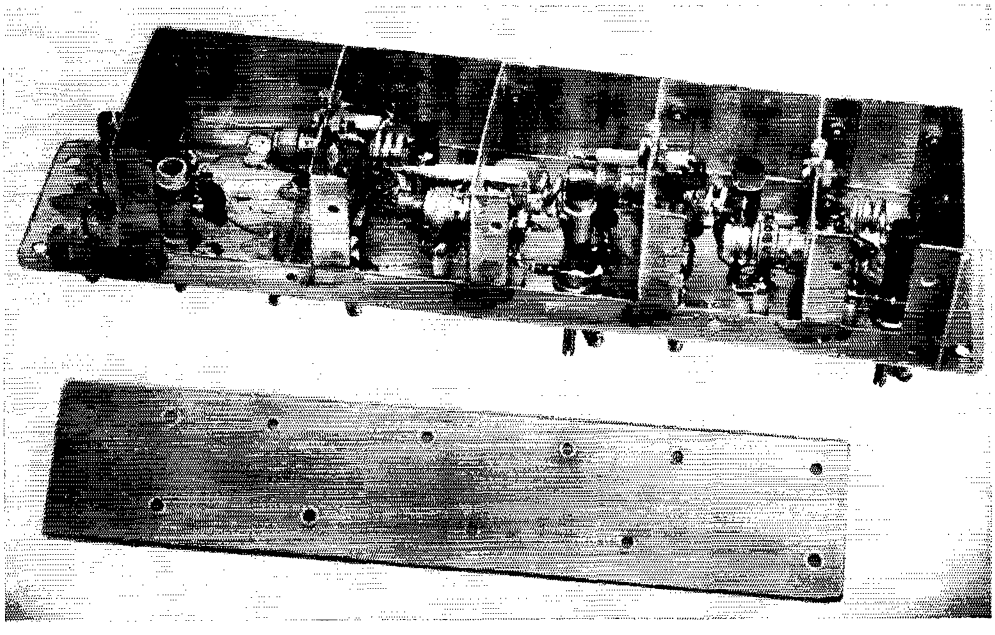
Circuit Features

The principal element of circuit novelty in this converter is the use of pi-network interstage and antenna-coupling circuits. These work well for matching impedances in both applications. The input coil L_1 may be used with coaxial line to the antenna, or with coax and a balun, working into balanced lines often used at this frequency. The loop is inserted at the cathode end of L_2, and the coupling adjusted for best signal-to-noise ratio. A noise generator is useful for this, and a real effort on the antenna stage is worthwhile, since it is here that over-all noise figure is established.

The tuning capacitors are inexpensive glass trimmers. Their range is greater than needed, but the coil size is adjusted so that resonance occurs near the minimum end of the tuning range. Coil leads are ¼ inch long, brought out at right angles to the coil axis. Care should be exercised to avoid buildup of stray inductance or the builder may find the tuning capacitors "hitting bottom" before resonance is reached.

Don't let the 100-pf. capacitors from cathode to ground in the r.f. stages scare you. Remember that this is a pi-network, and this capacitor is part of the tuned circuit. The input impedance of the 8058 grounded-grid amplifier is of the order of 100 ohms. Experiments have shown that about 200 pf. here gives optimum match, but with this value the tuning becomes rather sharp

Fig. 2—Interior of the converter, with bottom cover an one side plate removed. Antenna end is at the right.



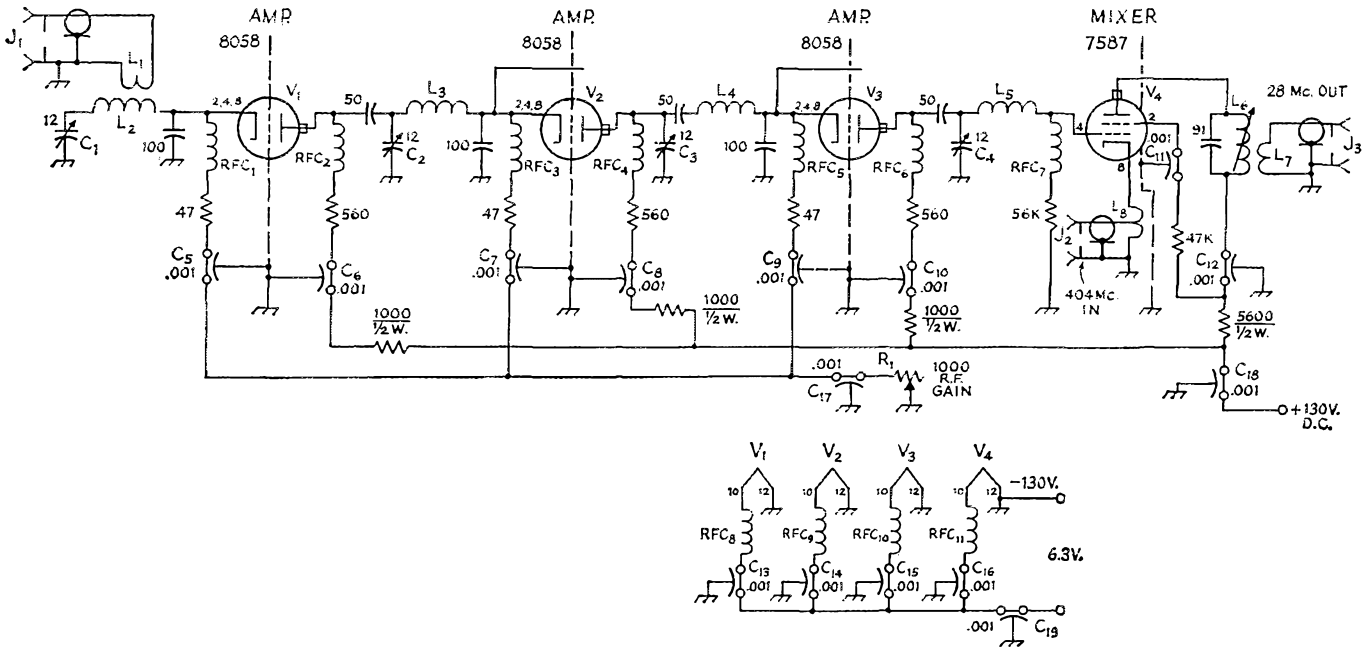


Fig. 3—Circuit diagram and parts information for the 432-Mc. converter. Unless specified, capacitors are tubular ceramic or dipped silver-mica. Connect with shortest possible leads. Decimal values are in μf., others in pf. Resistors not specified are ¼-watt.

C_1–C_4, incl.—12-μf. glass piston-type trimmer (JFD VC-52 or VC-57G).

C_5–C_{19}, incl.—.001-μf. feed-through capacitor (Centralab MFT-1000).

J_1, J_2, J_3—Coaxial receptacle, BNC type.

L_1—One turn insulated hookup wire between first two turns at cathode end of L_2.

L_2, L_5—3 turns No. 14, ¼-inch diam., spaced wire diam., with ¼-inch leads.

L_3, L_4—2 turns like L_2.

L_6—8 turns No. 26 enam., closewound on ⅜-inch diam. ceramic iron-slug form (Miller 4300).

L_7—2 turns No. 26 enam. wound over B-plus end of L_6.

L_8—See text.

R_1—1000-ohm control, not shown in photos.

RFC_1–RFC_7, incl.—No. 36 enam. closewound on ¼-watt resistor.

RFC_8–RFC_{11}, incl.—No. 28 enam. closewound on ½-watt resistor.

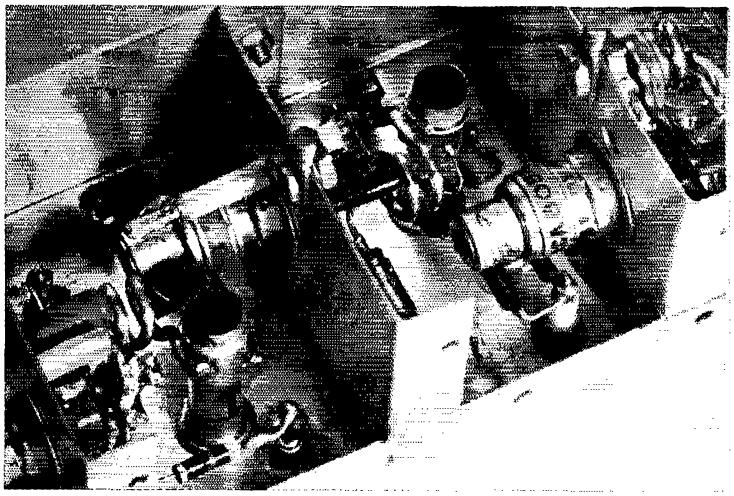


Fig. 4—Closeup view of the second and third compartments of the converter. Antenna input circuit is just visible at the upper right. The cathode end of each coil should be soldered in position first, and then the position of the coil adjusted so that it can be soldered to the glass trimmer without putting strain on the sleeve of the latter. Plate connections were made of .01-inch brass strip, bent around a rod slightly smaller than the plate cap.

and is subject to possible thermal drift. While 100 pf. at the cathode gives slight over-coupling, the gain is very nearly as high, and the circuit is a more practical one. Bandwidth of a single stage was measured at 8½ Mc., with a gain of 12 db.

Gain can be increased and bandwidth decreased by the addition of a "Q multiplier," a polite name for regeneration. This device, shown in the second and third stages in Figs. 3 and 4, is merely a probe of No. 10 copper wire connected to the cathode and extending through the partition adjacent to the plate terminal. It is insulated with Teflon sleeving. If the probe is as close to the socket as possible and extends to the tip of the plate, the gain will increase about 3 db and the bandwidth will drop to about half the previous value. A brass or copper "hat," ¼ by ½ inch, can be soldered to the end of the probe to increase feedback capacitance. Gains in excess of 20 db. per stage become unmanageable, and the amplifier may oscillate with the cover off. This device is not recommended for the antenna stage.

The type of mixer is largely a matter of choice. Impedance looking into the mixer grid is fairly high, and the input capacitance of the tetrode Nuvistor, plus circuit capacitance, is about right without an additional capacitor. Oscillator injection is brought in through a BNC connector directly below the mixer socket. The "inductance," L_8, is merely two pieces of wire, one from the connector to the 7587 cathode, and another ⅝-inch long from the connector to ground. While there are several ways by which injection could be achieved, this method is both simple and effective. If a good match is not obtained at the mixer cathode the length of the connecting coaxial line may become critical. If the injection level is low, try changing the length of the line, or adjusting the leads that comprise L_8. Injection level will not affect the over-all performance unless it is very far off, as mixer gain has a negligible effect on noise figure, with the high-gain front end used.

The mixer plate circuit has a low L/C ratio, to achieve a narrow i.f. passband. Most operation with this type of equipment is in a narrow segment of the band beginning at 432 Mc., so broadness at the intermediate frequency serves no useful purpose. Some communications receivers have poor image rejection in the 10-meter range, and with these a broad converter output characteristic may result in considerable difficulty with images at twice the receiver's first i.f. away from the desired signal frequency.

Results

It is difficult to describe the performance of a front end of this kind in terms other than noise figure, and few of us can measure this quality accurately at 432 Mc. It can be reported that stations as far away as Toledo, Ohio, were logged consistently with this receiver through the summer, fall and winter of 1963. This coverage in excess of 200 miles was accomplished with a 16-element collinear array 40 feet above ground and fed with 60 feet of 300-ohm Twin-Lead.

It is felt that the pi-network arrangement used is much more satisfactory than a tapped coil. The reason is that lead inductance and the ground return circuit play such an important part at these frequencies. Ordinarily it is difficult to duplicate 432-Mc. results when only minor changes are made in layout. It is difficult to locate a coil close enough to the socket to avoid appreciable lead inductance, and it is not easy to adjust the tap position for optimum performance.

With the pi-network matching circuit none of these difficulties show up. The network output capacitance can be located at the following tube socket, where it belongs, assuring proper power match. Since this capacitance is large compared with stray circuit capacitance, the effect of strays is lessened. In the amplifier described, the 8058 cathode pins are connected together with the shortest usable length of No. 20 busbar, and then solder is applied so that the three fuse together with minimum lead inductance. The grounded heater lug is bent back and soldered to ground with the shortest possible lead. Attention to such details is of utmost importance insofar as low noise figure is concerned. QST

VR-Tube Regulation—

Why and How

Operation and Circuit Design

BY ALBERT WEISS,* W6UGA

The rough-and-ready approach to adjustment of VR-tube current doesn't always give the best answer. Here's how to design the regulator circuit, including provision for line-voltage as well as load-current variations.

In circuit applications where supply-voltage stability is important, some method of voltage regulation must be provided to compensate for changes in load and line voltage fluctuations. For those cases where the current load is relatively small and subject to limited variations, the VR tube offers a cheap and simple solution to the regulation problem. Unfortunately, those publications available to the average amateur do not offer much help in outlining the design methods to achieve optimum performance for a particular application. For instance, the ARRL handbook says "adjust the series resistor for maximum VR-tube current with the load disconnected." This may get you by most of the time, but it may not result in optimum performance. In some cases, where the original unregulated supply voltage is marginally low or the required regulation range is too great, erratic operation may be the result.

For those readers who like to know "why it works," a discussion of the action in the VR tube may be in order. Let us take a simple two-electrode tube filled with a low-pressure gas (neon, argon, etc.) as shown in Fig. 1 and apply a variable voltage through a resistor. The voltage-current characteristic of Fig. 2 is the result. We see that at first the current increases with increasing voltage until point *B* is reached. This is the initial breakdown voltage where the tube breaks down into a visible glow discharge. The region between *A* and *B* is known as the "Townsend discharge." Between points *C* and *D* is the normal glow region, where the voltage across the tube is independent of the current through the tube. Beyond *D*, the voltage across the tube increases with increasing current until *E* is reached, where the tube breaks down into an arc discharge.

* 2370 Knob Hill Drive, Riverside, Calif.

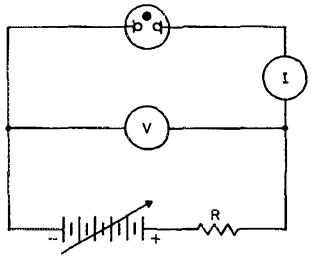


Fig. 1 (Above)—Circuit for obtaining the voltage-current characteristic.

In the normal glow region between C and D, the voltage drop across the tube is practically constant for a large range of current. Over this interval the tube has no control over the current, which must be limited by the series resistor, *R*, or the current will increase to such a value that the tube will be damaged or destroyed.

The actual VR tubes we use do not have similar electrodes for the cathode and anode. The cathode is a cylinder ¾ inch or less in diameter and about 1 inch long. The anode is a straight piece of wire along the cylinder axis. The tube is filled with an inert gas, generally argon, at a low pressure such that the breakdown voltage is only several volts higher than the tube drop in the normal glow region. To achieve this low breakdown voltage, a small starter wire projects from the cathode and almost touches the anode. The initial breakdown occurs at this point. As the

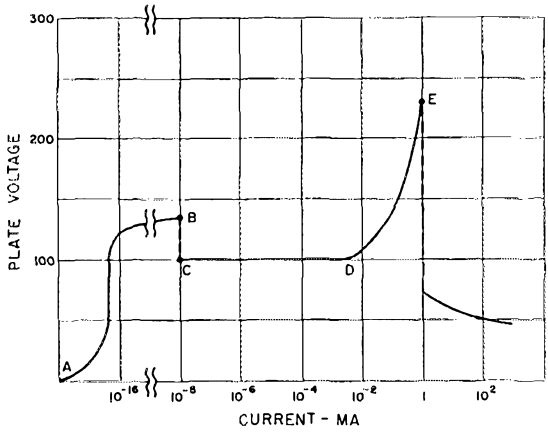


Fig. 2 (Right)—Voltage-current characteristic of a gas-discharge tube.

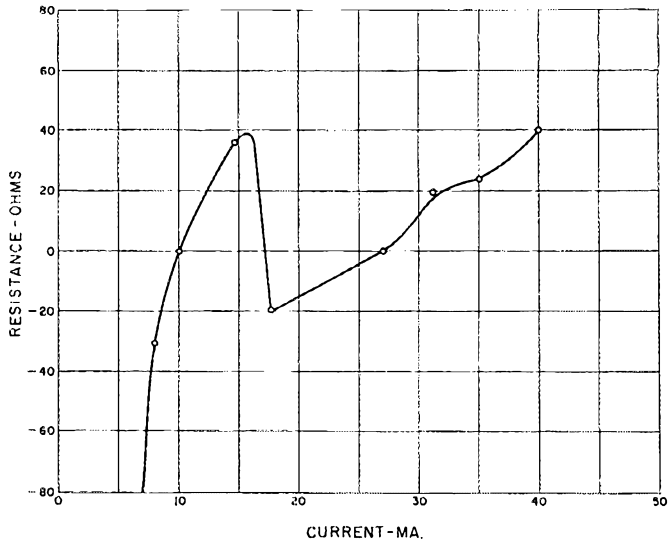


Fig. 3—Internal impedance-current characteristic of VR-105.

tube current increases to about 5 ma., the glow moves from the tip of the starter wire to the cathode cylinder. As long as the current is kept within the manufacturer's ratings (between 5-40 ma.), within the normal glow region, the tube drop remains almost constant. Obviously, if the unregulated supply voltage is high enough, the series resistor R can be made large enough to compensate for load changes within almost the entire range of 5-40 ma.

Before going into the specific design of a VR tube supply, it would be well to point out some properties of VR tubes which are not generally recognized. The tube handbook indicates the degree of stabilization over the current-range limits. However, the voltage across the tube is not actually a simple function of the current. In Fig. 3[1] the internal impedance of a VR-105 is plotted as a function of tube current. Observe that the VR tube looks like a negative resistance over a good portion of the lower-current operating region.

Among the problems the unwary designer using VR tubes may encounter as a result of the negative resistance characteristic is this: When the current is varied over a major portion of its operating range, the entire voltage-current relationship widens into a type of hysteresis loop of the sort shown in Fig. 4. Since the size and shape of the loop varies from tube to tube and also with the frequency, no quantitative recommendations can be made other than to caution against using the tubes over too wide a current range. Also, one should be careful not to place too much capacitance across the VR tube; experience has shown that capacitances greater than 0.1 μf. in parallel with the tube may lead to a form of relaxation oscillation.

[1] M.I.T. Radiation Lab series, Volume 21, page 530.

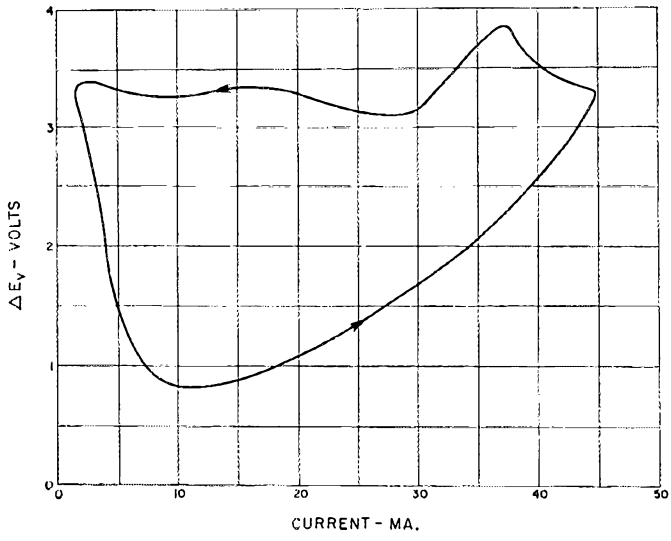


Fig. 4—Current-voltage characteristic of VR-105 at 120 c.p.s.

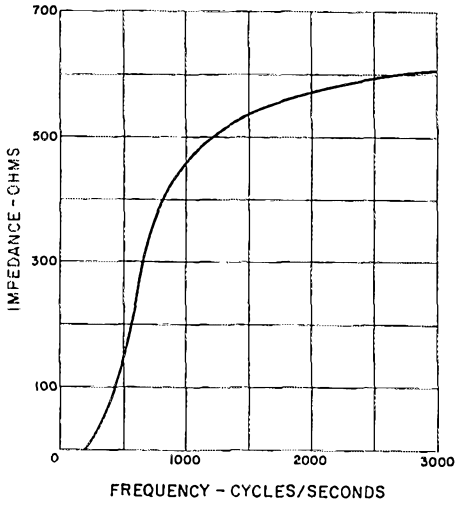


Fig. 5—Internal impedance of VR-105 vs. frequency.

Fig. 5 [1] will be of interest to those readers contemplating use of VR tubes in applications involving current variation over wide limits such as may occur in Class B linear amplifiers for s.s.b. or audio modulators operating in the Class B region. Observe the wide variation in the internal impedance of the regulator tube as a function of the modulating frequency. In the case of s.s.b. service where the VR tube may be used to regulate the screen voltage or the bias voltage of an amplifier drawing grid current, this could lead to some rather weird effects.

Let us now work out the quantitative relationships of the simple VR-tube regulation circuit shown in Fig. 6. If the load current is going to vary inside the limits I_{min} and I_{max}, the VR tube will have to accommodate this change in current. Here,

$$\Delta I = I_{max} - I_{min} \qquad (1)$$

The average load current then is

$$I_L = \frac{(I_{max} + I_{min})}{2} \qquad (2)$$

Since any line voltage variations will also lead to a change in VR-tube current, we will have to allow for them. In most cases, the changes in line voltage should not exceed ± 12.5 per cent. We will call this change N and express it as a decimal. If E_o is the normal unregulated d.c. voltage output of the unregulated supply, the total change will be

$$\Delta E = 2NE_o \qquad (3)$$

In order to simplify the design, we will include the internal resistance of the power supply in the value of R_s, which is the total series resistance between the VR tube and the unregulated output voltage, E_o, of the supply. This method is sufficiently precise for our purpose, since in nearly every case the limiting resistor will work out to a value much greater than this internal resistance. When the supply voltage for some reason changes in value by ΔE, the change in VR-tube current will be

$$\Delta I_v = \frac{\Delta E}{R_s} = \frac{2NE_o}{R_s} \qquad (4)$$

Most VR tubes have an operating range of 5 to 40 ma. Since we must design our circuit within this limit, the sum of all changes arising from either load or line-voltage variations must lie inside this region. Hence, the total current variation

$$\frac{2NE_o}{R_s} + \Delta I \leqq 35 \text{ ma.} \qquad (5)$$

The current flowing through the VR tube will be,

$$I_v = \frac{E_o - E_v}{R_s} - I_L \qquad (6)$$

where E_v is the rated voltage drop of the VR tube. Since E_o and I_L are the mean values of the supply voltage and load current ranges, the mean value of the VR-tube current will then be

$$I_v = \frac{(5 + 40)}{2} = 22.5 \text{ ma.} \qquad (7)$$

If we now combine equations 5 and 6, we get an expression for the size of R_s for optimum operation over the maximum range under the condition of

$$R_s \geqq \frac{E_v}{0.117 - 4\Delta I - I_L} \qquad (8)$$

To illustrate a working example of the use of this relationship let us take the problem of a linear amplifier using a pair of 6146 tubes in s.s.b. service where the screen voltage will be 150 volts

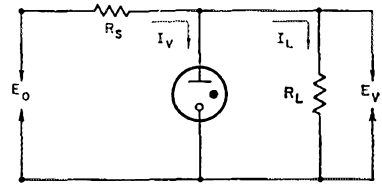


Fig. 6—VR-tube circuit.

and the screen current will vary between 1 and 20 ma. under modulation. Choosing a 150-volt VR tube we proceed:

$$\Delta I = 20 - 1 = 19 \text{ ma.}$$

$$I_L = \frac{(1 + 20)}{2} = 10.5 \text{ ma.}$$

Now we use equation (8)

$$R_s \geqq \frac{150}{0.117 - 0.076 - 0.0105} \geqq 5000 \text{ ohms}$$

Since the total current through R_s will contain both the load current, I_L, plus the VR-tube current, I_v, this will be 33.0 ma. Therefore the drop across R_s will be at least 181 volts. Hence the unregulated supply voltage, E_o, must be at least 181 plus 150, or 331 volts. If the supply voltage is greater than this, R_s is made correspondingly greater and the regulation characteristics im-

proved. Should the unregulated supply voltage be less than the required value, the operating range must be reduced to stay within the regulation limits, if optimum performance is desired.

Those who are unfortunate in that their line-voltage fluctuations lie outside the values chosen here to set the design parameters may modify the original derivation to suit their special cases by inserting the appropriate value for N.

If two or more VR tubes are used in series to obtain a higher output voltage the design is valid — remembering, of course, to use a value for E_V which is the sum of the drops across the tubes in series. QST

NEW BOOKS

Transistor Transmitters for the Amateur, by Donald L. Stoner, W6TNS. Published by Howard W. Sams & Co., Inc., Technical Book Division, 4300 West 62nd St., Indianapolis, Indiana 46206. 128 pages, including index, illustrated, 5½ × 8½ inches, paper cover. Price, $2.95.

What with the coming of high frequency high power transistors, interest of amateurs in transistor transmitters is on the increase. This book is directed toward the amateur who wants to build some transistor gear or who just wants to acquaint himself with transistor equipment theory. The book doesn't overlook the QRP man. Several transmitters in the low power bracket are also included. Construction projects for the beginner, as well as for the experienced ham, are described in detail. There is also a brief introduction on the history of transistor development, circuit configurations and testing and alignment. Chapter titles include: Oscillators, Building Oscillators, Power Amplifiers, The Novice Powerhouse, Modulation and Tunnel-Diode Transmitters.

Handbook of Ham Radio Circuits, by David E. Hicks, W9CGA. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. 128 pages, 8½ by 11 inches, paper cover. Cat. No. HRC-1. Price, $2.95.

This is a collection of schematic diagrams for amateur receivers, transmitters, transceivers, and r.f. power amplifiers. Accompanying the circuits is a short write-up on the equipment describing the circuit operation. Equipment covered: Receivers; Collins 75S-3, Drake 1-A, and 2-B, Hallicrafters SX-100, SX-117, Hammarlund HQ-110A, AC, AE, HQ-145X, XC, XE, Heathkit RX-1 (Mohawk), Knight-Kit model R-100A, Lafayette KT 200, Mosley CM-1 and National NC-183D. Transmitters; Collins 32S-3, Eico 720, Globe HG-303, Hallicrafter HT-32B, Hammarlund HX-50, Heathkit TX-1 (Apache), Johnson Viking Ranger, Johnson 6N2, Knight T-150, and RME-602. Transceivers; Clegg 99'er, Gonset Communicator III and IV, G-76, Hammarlund Model HQ-105TR, Lafayette HW-45A, and Lincoln L-2754. R.F. Power Amplifiers; Collins 30L-1 and Hallicrafters HT-33B.

Electronic Engineers & Technicians Reference Handbook, by Electronic Teaching Laboratories. Cat. No. ERH-1. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. 224 pages, including index, 5½ by 8½ inches, cloth cover. Price, $4.95.

This book contains 11 sections . . . ranging from vacuum-tube fundamentals to network analysis . . . and is directed to those who have a need for a complete reference on electronics principles and applications. There is material on mathematical derivations describing the operation of popular circuits, along with practical design examples. Some of the sections are: Power Dissipations and Transfer, Amplification and Tube Bias, Semiconductors, LC Oscillators Multivibrators, Diode Clampers and Clippers, Capacitors, Inductance, Impedance and Resonant Circuits.

1964 North American Radio-TV Station Guide by Vane A. Jones. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Ind. Cat. no. RSG-2, 8½ by 5½ inches, 128 pp., paper cover. Price $1.95.

This new volume contains over 7500 broadcast station listings, including 5000 a.m. and 1500 f.m. radio stations by city, state and frequency; and nearly 1000 TV stations, both u.h.f. and v.h.f. Call letters, frequency, location and power are listed of all stations now operating, slated to begin operation this year, or temporarily out of service. One integrated list by call letters names all radio and television stations: it's the only such list available. Twelve double-page maps, one for each channel, graphically show the distribution of v.h.f. TV broadcasting in the U.S. and possessions, Canada, Mexico, and the West Indies. Handy reference for anyone interested the broadcast industry: hams, DXers, BCLs, media reps, time buyers, marine and air pilots using BC navigation systems, and the curious.

Transistor Specifications and Substitution Handbook, by the Editorial Staff of TechPress Publications. Published by TechPress Publications, 4552 S. Kedzie Ave., Chicago 32, Illinois. 95 pages, 5¾ by 8¾ inches, paper cover. Price, $1.95.

This handbook has specifications for over 4,000 transistors representing almost 60 American and foreign manufacturers. The compilations for the various transistors are made up from the manufacturer's specifications and include the maximum operating parameters of the device. The handbook also contains information on substitutions, symbols, and case diagrams. There is a brief discussion at the beginning of the book on such transistor-related topics as reverse leakage current, gain bandwidth product, collector power and current, and an explanation of how substitutes are chosen. An especially interesting article included in the handbook is entitled "Ten Pitfalls To Avoid In Using Power Transistors."

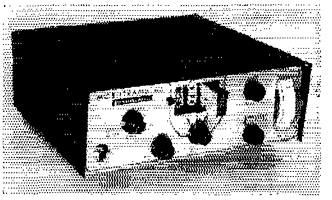
Electronic Test Instrument Handbook, by Joseph A. Risse. Cat. No. ETI-1. Published by Howard W. Sams & Co., Inc., 4300 West 62nd St., Indianapolis 6, Indiana. 288 pages, including index, 5½ by 8½ inches, paper cover. Price, $4.95.

What with all of the vast array of test, measuring, and indicating devices on the scene today, it is only natural that a book appear on the subject of how they operate and when and how they should be used. This handbook describes the basic operating principles of test instruments with individual sections devoted to coverage of VOM's and VTVM's, tube testers, transistor and diode testers, battery testers, signal generators, capacitance, inductance and impedance tests, Q-meters, oscilloscopes, frequency and modulation measurements, and various specialized test instruments, such as noise and distortion meters. Percision and laboratory test instruments for industrial work, along with special radio and TV servicing instruments, are also covered.

• Recent Equipment —

Mobiltrans "40"

Transmitter-Converter



THE Mobiltrans "40" offers a refreshing change from the complicated circuitry and construction of today's transceivers, electronic keyers, and the like. This little rig is simple and uses straightforward construction and circuits, yet is full of interesting ideas and takes advantage of modern components in its design.

The Mobiltrans "40" consists of a one-band a.m. transmitter and a crystal-controlled converter that heterodynes incoming signals to a tunable i.f. inside the standard a.m. broadcast band. It is available for 160, 75, or 40 meters. Designed primarily for 12-volt negative-ground mobile operation, the unit, when combined with the car's b.c. set, makes a complete one-band mobile a.m. station.

The block diagram of Fig. 1 shows the general layout and functions of the major components. Transistors are used throughout the circuit except for the final r.f. amplifier, V_1, which is a power pentode Compactron.

The reader may wonder, after a glance at Fig. 1, where the high voltage for the vacuum-tube final amplifier comes from. A novel scheme similar to that used by Meissner[1] in a rig described in *QST* a couple of years ago generates high-voltage d.c. by rectifying audio from the speech stages of the transmitter. Low-level audio from a carbon microphone is amplified in a transformer-coupled Class-B transistor stage, Q_1 and Q_2. Here the audio is split into two channels, one going to the push-pull audio amplifiers, Q_3 and Q_4. Output from the audio amplifier is transformer-coupled to a bridge rectifier and filter system to produce up to 500 volts peak d.c. with voice signals. With no voice input, the voltage falls to zero. The transmitter literally operates from "talk power".

Other sections of the transmitter and converter operate directly from 12 volts d.c. The crystal-controlled oscillator, Q_9, is an n.p.n. transistor stage operating at the fundamental crystal frequency. Three crystal sockets and a three-position XTAL switch are provided on the front panel of the unit.

Output from the crystal oscillator drives the 8156 r.f. amplifier, V_1. Its plate circuit is a pi network using a toroid inductance. The tuning and loading capacitors are compression trimmers. The instruction manual does not mention the range of the pi network, but an entire page in the manual is devoted to mobile antenna adjust-

[1] Meissner, "Five Transistors — Two Tubes — 35 Watts", *QST*, April 1962.

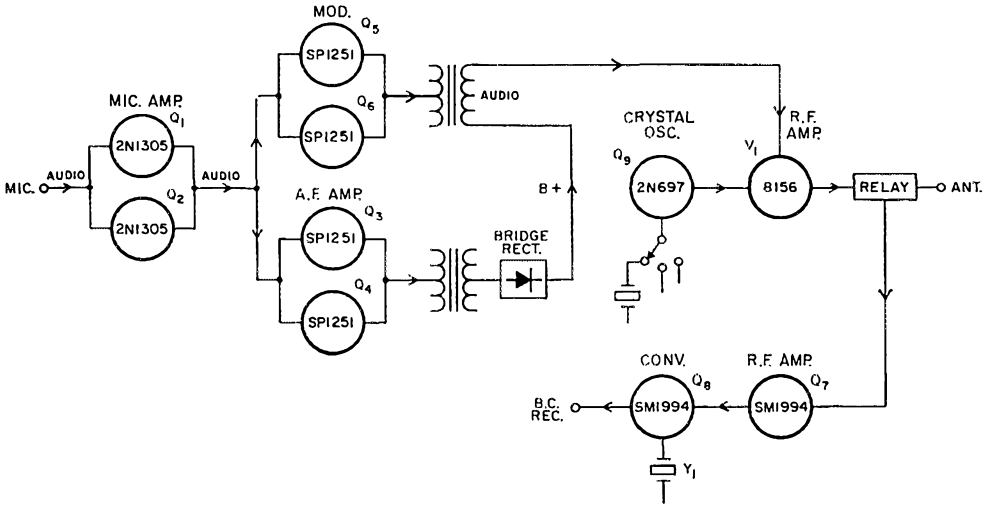
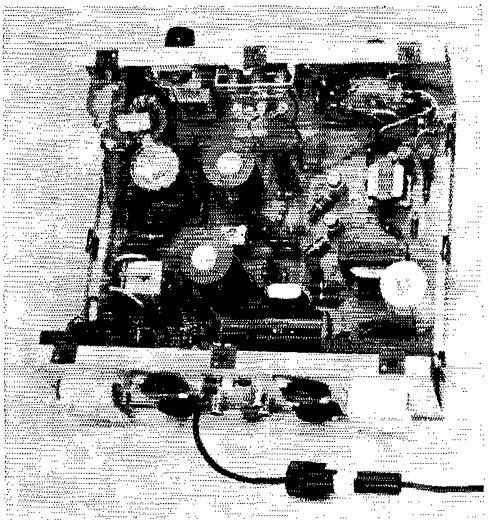


Fig. 1 — Block diagram of the Mobiltrans 40



This is a view of the Mobiltrans 40 with part of the cabinet-top removed, looking down on the top and rear of the unit. The final r.f. amplifier, a Compactron, is at the upper left as is the final amplifier toroid tank coil. Power supply, audio transformers, and transistors are mounted on the rear panel and are visible in this shot. Phono connectors on the rear panel are for connections to the antenna and to the broadcast receiver.

ment. If the owner follows the suggestions given in the manual, he shouldn't have any trouble with antenna matching, even on 160 meters.

The Mobiltrans has a built-in relay that transfers the antenna from the transmitter to the converter and also switches the 12-volt power from send to receive. The relay is operated remotely by the push-to-talk circuit.

When receiving, signals from the antenna are amplified in a transistor r.f. stage, Q_7, and then converted to the broadcast band in a transistor mixer-oscillator, Q_8. This stage is crystal controlled, with the crystal, Y_1, on the low side of the incoming signal on 40 and 75 meters, and on the high side on 160 meters. The actual tuning ranges of the system on the three bands are 1.9 to 2.0 Mc., 3.8 to 4.0 Mc., and 7.2 to 7.3 Mc. The car-radio tuning-dial readings for the above ranges are 160 meters, 700 to 600 kc.; 75 meters, 650 to 860 kc.; and 40 meters, 750 to 850 kc. A rear panel switch allows for switching the Mobiltrans out of the b.c. receiver circuit so the car radio can be used for broadcast reception.

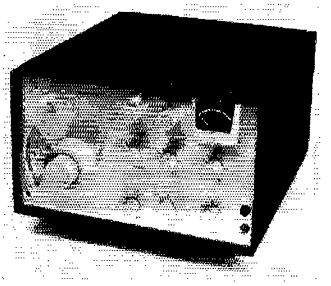
Other front-panel components include the already-mentioned final-amplifier TUNE and LOAD controls, the three-position crystal switch, and three crystal sockets. There is a function switch with five positions. At OFF, all circuits are disconnected from the car's battery. At OPER, the converter transistor and the 8156 final amplifier tube heater are energized. When the microphone push-to-talk button is closed, the rig is switched to transmit. At TUNE, the modulator stage, Q_5 and Q_6, is disabled. When the push-to-talk circuit is closed the microphone amplifiers, Q_1 and Q_2, oscillate at an audio frequency, driving Q_3 and Q_4 to produce a constant plate voltage so that the final r.f. amplifier stage can be tuned. At SPOT, the crystal-oscillator stage, Q_9, is turned on but at a reduced level, to give a signal for frequency spotting or to act as a crystal-controlled b.f.o. for detection of c.w. or s.s.b. signals. The AUX setting gives an additional switch contact on four sections of the function switch for future additions or modifications to the equipment. The other two items on the front panel are the mike jack (3-conductor, ¼-inch shaft) and the plate and screen current meter (0 to 150 ma.).

Before wrapping up this write-up on the Mobiltrans "40", a few words should be added about the construction and components. There are lots of ideas here that could be adopted by the home constructor. The use of etched or "printed" circuits reduces the size and complexity of the unit and gives it a clean, neat look (the Mobiltrans uses an epoxy-glass printed-circuit board). The cabinet is actually two pieces of U-shaped aluminum held together with shake-proof speed-nuts that simply snap into holes drilled in the aluminum — a method of cabinet construction which could easily be duplicated in the ham workshop. When assembled it has the appearance of a professional one-piece cabinet. The r.f. coils are sealed in plastic tubes filled with epoxy. The coil assembly plugs into a standard miniature-tube socket. The already-mentioned toroid and compression trimmers in the pi network maintain the proper inductance, capacitance and Q, but are substantially reduced in size as compared with conventional components. A diode in the power lead protects the transistors in case the power leads are connected to the wrong polarity, and a 2,000-μf. capacitor across the power input leads discourages voltage transients from damaging the transistors. — *E. L. C.*

JUSTIN MOBILTRANS "40"

Height: 2⅞ inches
Width: 8 inches
Depth: 8¼ inches
Weight: 5 pounds
Power requirements: 12.6 v.d.c., 6.5 amps. max., 300 ma. standby.
Price class: $100
Manufacturer: Justin, Inc., Box 135, San Gabriel, California

Galaxy III Transceiver



As almost any radio dealer will tell you, transceivers are among the hottest items on the ham market today. With no letup in the demand for the small-packaged stations, manufacturers are bringing out a second generation of transceivers with refinements that hams have asked for. A good example is the Galaxy III, which supersedes the Galaxy 300 transceiver.[1] The Galaxy III is smaller than its predecessor, and has full coverage of the 80-, 40-, and 20-meter bands, with some excess on the latter two. Transistors are used in the receiver audio, a.g.c., and VOX circuits for a saving in power, which is a help when the unit is used for mobile or portable operation.

Transmitter Section

Fig. 1 shows the block diagram of the Galaxy III transmitter, which is rated at 300 watts p.e.p. input on s.s.b. and 300 watts c.w. Since the unit is a transceiver, several of the tubes operate both in transmitting and receiving. These are shown in the block diagram with a star alongside the tube symbol. The transfer from send to receive is accomplished by actuating the push-to-talk circuit or the VOX.

When transmitting, audio from any high impedance microphone is amplified in V_6 and fed to the 12AT7 balanced modulator V_7. A 6GX6 carrier oscillator furnishes r.f. at either 8.99875 Mc. or 9.00125 Mc., depending upon whether upper or lower sideband is desired, and this signal is fed to the balanced modulator to give a double sideband signal (carrier suppression is rated at 45 db.) at the input of the 9-Mc. crystal filter. After passing through the filter, which has a bandwidth of 2.1 kc. (sideband suppression is rated at 55 db.), the single-sideband signal is amplified in V_3, a 12BA6, and passed on to the

[1] "Recent Equipment", *QST*, Oct. 1963.

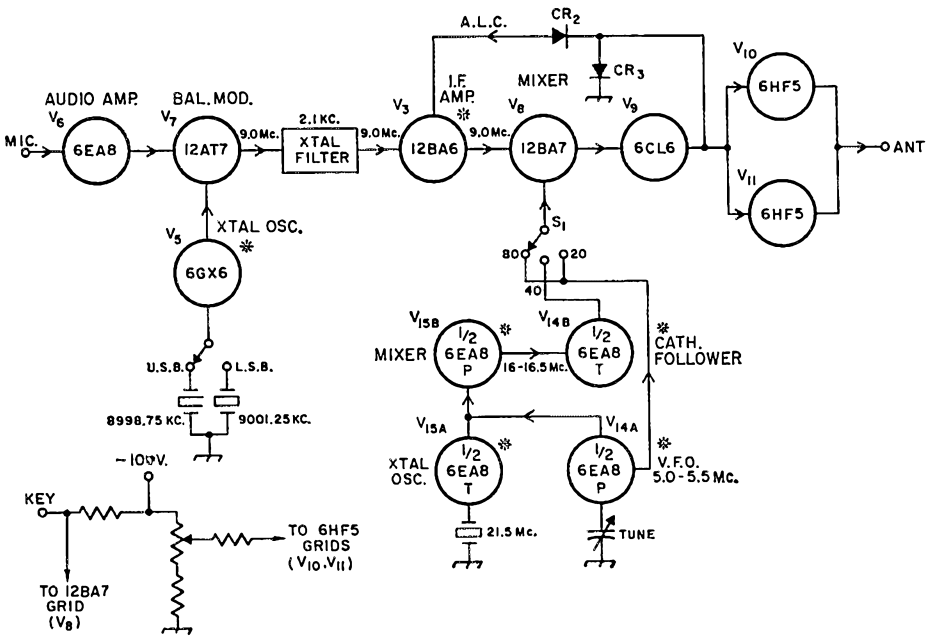


Fig. 1—Block diagram of the transmitter section of the Galaxy III.

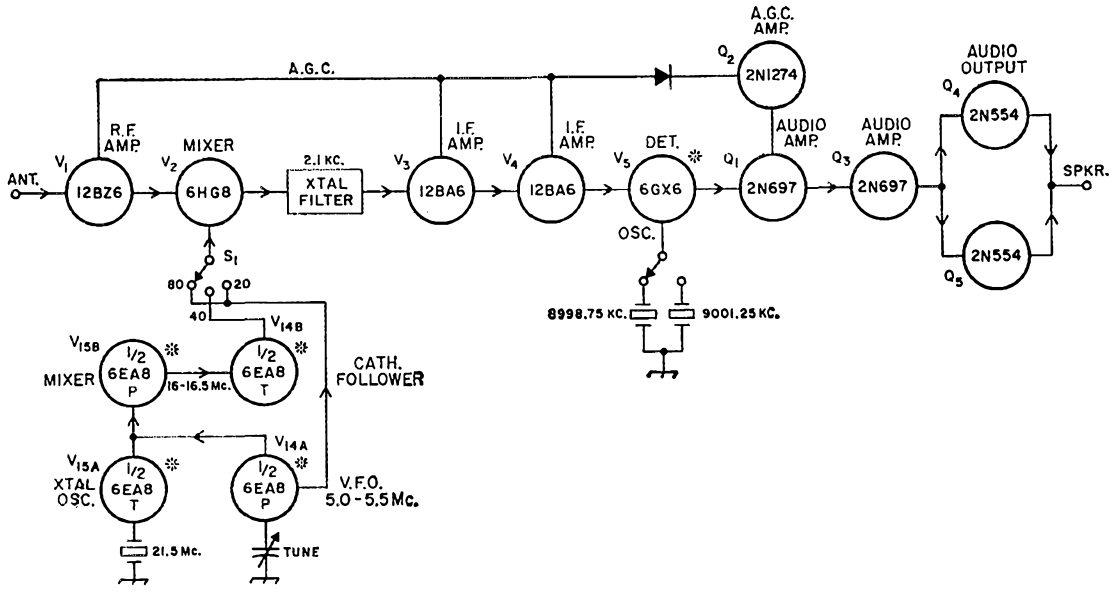


Fig. 2—Block diagram of the receiver section of the Galaxy III.

12BA7 mixer, V_8. Here the s.s.b. signal is heterodyned to the desired amateur frequency. Injection is furnished by a combination of a mixer and oscillators, V_{14} and V_{15}. The v.f.o., V_{14A}, has a basic tuning range of 5.0 to 5.5 Mc., and when operating on the 80- and 20-meter bands, output from the v.f.o. is passed directly to the 12BA7 mixer, V_8. On the 7-Mc. band, a second 6EA8 crystal-controlled oscillator, V_{15A}, is combined with the 5-Mc. output from the v.f.o. in the 6EA8 mixer, V_{15B}, to give an output of 16 to 16.5 Mc. This signal goes to a cathode follower, V_{14B}, and then to the 12BA7 mixer, V_8. Stability of the v.f.o. is rated with drift less than 100 c.p.s. in any 15-minute period after warm-up and with less than 100-cycle frequency change for 10 per cent change in line voltage.

The amateur-band signal from mixer V_8 is amplified in the 6CL6 driver, V_9, which in turn feeds the 6HF5 parallel-connected r.f. amplifiers. A pi network in the plate circuit is designed for resistive loads between 40 and 100 ohms. Two 1N462 diodes, CR_2 and CR_3 in Fig. 1, are used to detect any 6HF5 grid current. This voltage is used to control the gain of the 12BA6 i.f. amplifier giving an a.l.c. action.

An accessory VOX unit is available for use with the Galaxy III. Audio taken from the audio amplifier, V_6, is amplified in a transistor stage and then rectified by two 1N54 crystal diodes. This d.c. signal, along with another signal from the anti-VOX circuit, is amplified in a transistor d.c. amplifier which controls the send-receive relay.

On c.w., the Galaxy is grid-block keyed. The key is in a negative bias line that keys the grid of the mixer, V_8.

Receiver Section

The receiver block diagram is shown in Fig. 2. Signals coming from the antenna are amplified at V_1, and then fed to the mixer, V_2. Also arriving at the mixer is the local-oscillator energy which is generated in the same manner and with the same components as that used in the transmit mode. Output from the mixer, V_2, passes through the 9-Mc. filter, through two stages of i.f. amplification, and is then detected at V_5, a 6GX6. The b.f.o. is crystal controlled and is switchable for upper or lower s.s.b. reception.

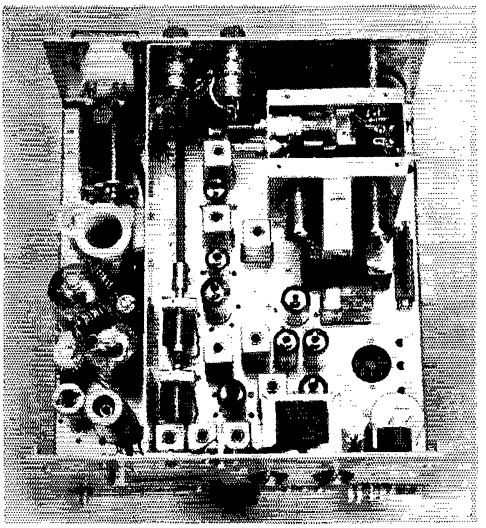
Output from the detector is amplified in several transistor stages which give sufficient audio (up to 3 watts) to drive a low-impedance loud speaker. In fact, there's plenty of output from the receiver even when the gain control is turned all the way down, which is okay for mobile but is sometimes annoying in the home shack!

A transistor a.g.c. amplifier and diode rectifier give a negative bias for a.g.c. which is applied to the two i.f. stages, V_3 and V_4, and to the r.f. amplifier, V_1. The audio-derived a.g.c. is fast-attack fast-decay for 20-db. variations and slow-attack slow-decay for greater variations.

An accessory crystal calibrator is available for use with the Galaxy III to give 100-kc. calibration markers.

Other Comments

The layout of the Galaxy III is shown in the accompanying photograph. The front panel has a satin chrome finish and the cabinet is done in black wrinkle. The operating controls are: CALibration ADJust, R.F. and A.F. (these two controls are on concentric shafts), MICrophone gain, FUNCTION switch (CAL, PTT, VOX, TUNE, CW) BANDSwitch, EXCITER tuning, SIDEBAND selector, final PLATE tuning, and final LOADing. Some of the panel control labels and the tuning dial



The cabinet has been removed in this view of the Galaxy III transceiver. The final amplifier section is to the left of the photograph. The v.f.o. section is at the upper right. The black object just below the v.f.o. compartment is the crystal filter. A transistorized VOX unit, available as an accessory, plugs into the empty octal socket at the lower right of the chassis.

scales are color coded to aid the operator in manipulating and reading the dials. There are two different-colored indicator lamps on the panel to show which sideband is in use.

Speaking of controls, mention should be made of the excellent tuning drive in the Galaxy III. The mechanism has two reduction drives, allowing the operator to use a large-diameter knob to skim across the band in five turns, or a concentric inner small knob which takes 36 turns to cover 500 kc. for slow tuning. The tuning capacitor is driven through a 2:1 gear drive which is spring loaded for antibacklash. This, along with two 6:1 planetary drives connected in cascade, provides the 72:1 slow tuning rate feature. The tuning dial has about 9 inches of bandspread. The dial calibrations are every 5 kc.

Rear chassis connections include a push-to-talk control jack (phono jack), socket for an external v.f.o. (phono jack), key jack (phone jack), extra microphone jack (phono jack), and a phono jack to supply 12 volts a.c. for meter illumination on an accessory console. A stud ground connection is provided.

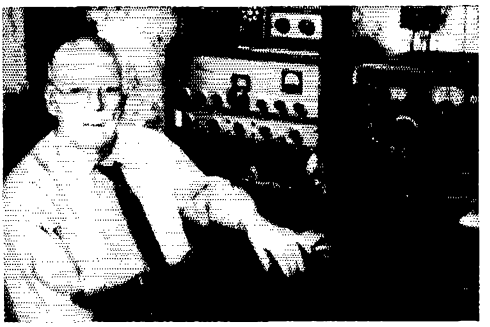
For better cooling, the two 2N544 audio output transistors are mounted on the rear apron of the chassis away from internal heat.

Power supplies for a.c. and d.c. operation of the Galaxy III are available from the manufacturer. Other accessories include a speaker console that houses the a.c. power supply, the already mentioned 100-kc. calibrator and transistor VOX unit, and a remote v.f.o. A deluxe console that has speaker, s.w.r. bridge, and VU meter, and a universal mobile bracket for under-dash or transmission-hump mounting of the transceiver is also available. — *D.A.B. & E.L.C.*

GALAXY III TRANSCEIVER

Height: *6⅛ inches*
Width: *10½ inches*
Depth: *11½ inches*
Power requirements: *800 volts d.c., 100 ma., 350 volts d.c., 200 ma., —100 volts d.c., 35 ma., 12.6 volts a.c./d.c., 5 amps., 12.6 volts d.c., 1 amp.*
Price class: *$350.*
Manufacturer: *Galaxy Electronics, 10 South 34th Street, Council Bluffs, Iowa.*

Strays



An amateur radio exhibition is planned for three weeks in October at the Old Slater Mill Museum at Pawtucket, Rhode Island. The Museum occupies the original but expanded mill built in 1793 by Samuel Slater, which became the first successful enterprise in the U. S. for spinning yarn on water-powered machines.

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Another nonagenarian is W8QP of Findlay, Ohio, active on 80, 40, and 20 meters "Uncle Ed" was born in 1873, became a Morse telegrapher in 1893, and was on the air as a ham "before it was necessary to have a license."

Fourth World-Wide RTTY Sweepstakes

October 17–19

RTTY, INC. announces the Fourth World-Wide RTTY Sweepstakes to be held from 0200 GMT October 17, to 0200 GMT, October 19, 1964. The contest looks to be bigger and better than ever this year because of greatly increased amounts of overseas activity on f.s.k. Suitable awards will be given to the ten top scorers.

Stations will exchange messages consisting of message number, check (RST), time in GMT, and name of state or foreign country.

Be sure to check carefully the log form, scoring sample, and complete SS rules which follow. Logs and score sheet must be received by RTTY, Inc., 372 West Warren Way, Arcadia, California, by November 27, 1964 to qualify.

Rules

1) This is a competition between all stations throughout the world to determine their ability to exchange messages via two-way radio teleprinter.

2) *Contest period:* 0200 GMT, Oct. 17, to 0200 GMT, Oct. 19, 1964.

3) *Bands:* This test will be conducted in the 3.5, 7.0, 14.0, 21.0, and 28.0 Mc. amateur bands.

4) Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if a different band is used. To encourage multi-band DX operation, the same country may be claimed more than once if contacted on different bands. The same state worked on more than one band may only be claimed once.

5) *Country status:* For the purpose of this contest, KH6, KL7, and VO will be considered separate countries, in addition to the ARRL Countries List.

6) Stations will exchange messages consisting of message number, check (RST), time in GMT, and state or foreign country.

7) *Points:* (a) All two-way RTTY contacts by North and South American countries (including KH6) will earn two (2) points. (b) All two-way RTTY contacts by countries other than in (a) above will receive ten (10) points. Partial contacts do not count. (c) All stations receive 200 points per country worked, not including their own.

8) *Scoring for all stations:* (a) Two-way exchange points times total states worked. (b) Total country points per band times number of continents worked. (c) Add item (a) and (b) above, for your *FINAL SCORE.*

9) Follow the sample score sheet and log form shown. Log the state only once, the first time contacted. Log the country the first time contacted on each band. To qualify, logs and score sheet should be received by RTTY, Inc., 372 Warren Way, Arcadia, California, 91007, by November 27, 1964. QST

LOG, FOURTH WORLD-WIDE RTTY SWEEPSTAKES

Station log of W6TPJ (call) My state or country Calif. Date 17, Oct. 1964

NR Sent	*RST Sent*	*Time Sent*	*Band*	*Station*	*NR Rcvd.*	*RST Rcvd.*	*Time Rcvd.*	*State or Country*	*Exchange Points*
1	589	0205	14	W6CG	2	589	0204	CALIF.	2
2	569	0230	14	VK3KF	6	579	0231	AUSTRALIA	2
3	?	?	14	W6NRM	4	359	0240	—	0
4	599	0300	14	W2JAV	7	599	0259	NEW JERSEY	2
5	579	0514	7	VK3KF	22	569	0514	AUSTRALIA	2

CLAIMED SCORE: (a) Exchange points 8 × 2 States = 16

(b) Country points 400 (2 × 200) 2 Continents = 800

Add (a) and (b) = 816

FINAL SCORE

This log is correct and true to the best of my knowledge.

Signature

Strays

Don Cummins, K1TFS, West Hartford, Conn., reports excellent results with his "electronic storm finder" (Leary, June, 1964, *QST*). His 'scope is built around a surplus IP-94/APA-17 radar indicator; the 5-inch tube gives a larger presentation than the 3-inch tube mentioned in the original article.

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Blind amateur radio aspirants can obtain complete taped code instructions free of charge by requesting them from the Library of Congress, Division for the Blind, Washington 25, D. C. The course is taped on two sides of seven 1800-foot magnetic tapes at 3¾ i.p.s. and each tape should be studied separately in sequence. — *W1NAD/WA6VTL*

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Feedback

The eye lens used in "The Aurorascope," described by K8ZQE in *QST*, July, 1964, has a focal length of 17 mm., or 21/32 inch. The text describes this as having a focal length of 2 1/32 inch. Thanks to reader Ronald Abileah, Forest Hills, N. Y., for pointing out this error. The part number given is correct.

• QST Article Contest Winner

Who! Me?

Yes—You!

250,000 Ham Ambassadors Project a BIG Image Overseas

BY MARCUS A. FELT,* W2GYQ

THIS is the year of the great World's Fair, a 50th anniversary of organized American hamming, and the year of decision on incentive licensing. Whether we like it or not, world involvement has crept up on us — we're in the international drink; and we've got to start swimming or sink! We hams have always shrunk the world; it's been our dream. Now the world is upon us and we can't shrink from the responsibility.

The amateur fraternity is traditionally an internationally-minded group. Regardless of specific technical or operating interests, it's a rare ham who doesn't have some amount of contact with our foreign colleagues. Historically our hobby is grounded in the motivating thrill of getting that signal "across." If you're unconvinced, obtain a copy of *Two Hundred Meters And Down*, by Clinton B. DeSoto.

However, in addition to putting out r.f., your ham station is generating a sideband that can't be filtered out; we may call this your PS, or personality sideband. This PS signal is at all times a projection of you: as a human being, as an individual from a sectional part of the United States, and over all as a citizen of the United States. How do you stack up?

It is not necessary that you be in direct contact with an overseas ham to project a PS image. In addition to the 125,000 licensed foreign hams there is a vast uncounted group of SWLs who copy your QSOs regardless of whether you're in stateside or foreign contact. This vast audience of hams and SWLs is learning about America from *you!* Are we projecting the image we mean to project — or do our overseas friends get a distorted American PS?

Is it important to be concerned about what citizens of other countries think of us? It most assuredly is—and if you have doubts, ask the men who must represent American hamdom at the next international radio conference. How do the DX lads "see" you? Are they placing you in the "Handsome American" slot, or do you fall in that other well-publicized category?

Do you stay alert to the fact that as you transmit, unknown numbers of listeners seize upon your words to gather some knowledge of what Americans really believe? These listeners are gathering impressions and interpreting America in the only way they can — from what they hear. After all, we are the most numerous and loudest voices in the ham world. How is our record in this respect? How do we appear as people to our listeners overseas? Are we just loud, which is OK — or are we loud-mouths?

Do we impress them as self-seeking acquisitive individuals? In recent on-the-air debates concerning incentive licensing, how many foreign amateurs and SWLs (using home-brewed equipment made from parts gathered together under great difficulties) were treated to passionately-delivered orations that sounded substantially as follows: "I've got thousands of dollars invested here in the finest commercial equipment, and no blankety-blank fathead group of ARRL dictators is going to put me off the air; and as an American citizen, the FCC has absolutely no right to grant me a license and then remove my privileges." Is this the image we truly wish to export overseas?

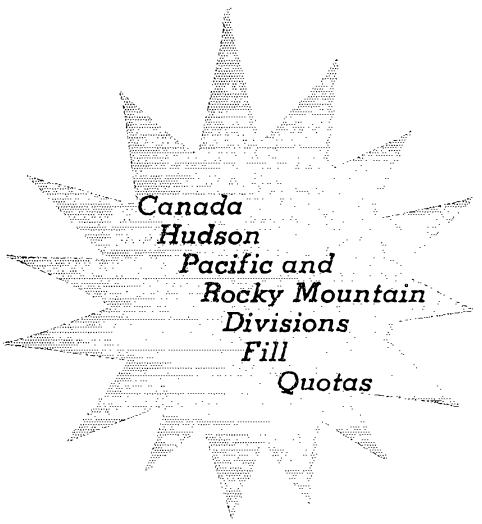
This year of 1964 may well be a year of great decisiveness for hamming, and especially for the American fraternity. What specific attitudes and actions can each of us initiate to enhance our international image, project the friendliness and helpfulness we really feel, and extend the hand of American leadership, minus the "king of the mountain" attitude, to our many friends overseas?

Every ham in our fraternity who makes a DX contact outside the borders of the U.S. has a golden opportunity to be a friend-producing ambassador for this country. Our friends overseas have made the great effort to learn the English language so as to QSO us with some semblance of intelligibility. Thousands of contacts are made daily between us and foreign amateurs; in too many cases the effort of communication is placed completely upon the foreign-speaking ham. His English is usually expressed with great difficulty: have we been very helpful? We know that by and

(*Continued on page 156*)

* 50 Prince Lane, Westbury, L.I., N. Y.

Building Fund Progress



In a last-minute flurry of activity, four divisions — Canada, Hudson, Pacific and Rocky Mountain — joined Dakota and New England as recipients of special plaques recognizing their achievement of the Building Fund quota prior to the national convention.

Within striking distance for the past month or so, Canada (led by VE3CJ and VE3HC) filled its final few percent during the week preceding the convention. The Hudson Amateur Radio Council presented a contribution to push its division over the top. A substantial check from W7MKL inspired Rocky Mountain Division amateurs, through their director, to achieve the goal, helped also by a second contribution from the Estes Park convention funds. During the national itself, a handsome contribution from Ralph and Sophie Heintz, W6RH and W6SH, sparkplugged action in the Bay area to get the Pacific Division over its quota just hours before the deadline.

The division standings at the end of August are shown below:

Dakota	**121%**	Central	83%
New England	**116**	Southwestern	83
Rocky Mt.	**108**	Midwest	81
Hudson	**100**	Delta	79
Canada	**100**	West Gulf	76
Pacific	**100**	Atlantic	64
Northwestern	91	Southeastern	56
Roanoke	87	Great Lakes	54

Members Are Saying

Here is, willingly, my second contribution. Recently it dawned on me that this would be an excellent means to say, "Thank you — for capable representation at the various conferences; for your courageous stand in attempting to upgrade the status of the amateur; for your always firm stand on retention of our privileges; for countless other jobs well done." Most important, though, thanks for the fact we have amateur radio; "no League, no ham radio" — it's as simple as that. — *WA9JWT.*

Inertia, rather than poverty, has delayed my contribution, and that will have to serve as my excuse. I won't sing the praises of ARRL — you've heard all that before — but I will say it is hard to imagine the existence of amateur radio as we know it without the support of ARRL. Like most other folks, I don't always agree with everything the League says and does, but in issues of consequence (RM-499 for example) agreement comes easy. — *W8ETV.*

May I take this means to thank you for those helpful code practice sessions which helped launch my amateur career. — *K1VQJ.*

In commemoration of ARRL's 50th anniversary, the Allegan Area Radio Club (Michigan) sends the enclosed contribution on behalf of its charter, past and present members. — *W8FLA.*

Enclosed is my second contribution. Keep up the fine work! I don't always agree with everything the League does, but that's part of the game I suppose. I certainly wouldn't get out just because I don't agree with a certain point. After all, no group can please everybody! — *W5WQX.*

As an ARRL bond purchaser following World War I, I can't resist being a contributor to the new ARRL station and headquarters building, a most worthy undertaking. — *W5ZC* (membership card #55, station appointment #174, 1917).

On behalf of the member clubs of the Hudson Amateur Radio Council it gives me great pleasure to transmit the enclosed check which we believe will push the Hudson Division "over the top." — *W2TVK.*

My deepest thanks to ARRL for the help in my quest for a General ticket; without this help I probably would not have had the courage to have tried even for Novice. — *WN8KGH.*

Since the enclosed is my third donation, let it convey a message of confidence I have in your work well done. — *W4SJKD.*

I am grateful for the many years of fine service by the League to the advancement and preservation of amateur radio, and I know that the same service will be given to us newer fellows for many more years from the new headquarters. — *WN3UOH.*

I have tried four times to write a letter to go with my enclosed contribution, each time not liking how it came out. It all boils down to this: here's all the money I, a 13-year-old ham, can give; it's simply to say thanks for all the help you have given. — *WN2MYU.*

This is in recognition of the fine work — both technical and administrative — of the League over the years. — *W3MNU.*

ARRL 1949–1953 Sideband, TVI — and Regulatory Battles

THE BATTLE between phone men and those who prefer the key has been long, sporadic and — for the most part — under the surface. The years under discussion, 1949–1953, constitute one period when the fire broke loose and the flames were clearly visible.

It started after World War II when the ARRL Board proposed some increase in subbands for radiotelephone. The proposals were later set aside, to await the conclusion of the international conferences at Atlantic City. In the meantime, however, a group of ardent disciples of Morse — determined to prevent the spread of A-3 operation — formed themselves into the Society of American Radio Amateurs, with headquarters in Washington, D.C.

The Atlantic City conference over, the League's Board — after long and thorough discussion of postwar amateur radio by a special planning committee — asked in 1948 that FCC change the rules to require new Class A applicants to pass a test in the code at 16 w.p.m. and to prohibit new Class B and Class C operators from using phone on bands below 30 Mc. during the first year of their licenses. The Board also asked the Commission to widen the 75-meter phone band by 50 kc., so it would then read 3800–4000 kc. and to continue the 40-meter band as c.w. only.

The proposals were duly made to FCC. Shortly thereafter the formation of the National Amateur Radio Council was announced, made up of amateurs who felt that the 1948 Board actions were not the will of the membership generally and were grossly unfair to phone operators.

Within a few months, NARC had made its own filing with FCC, asking for expansion of 20 phone to 14,200–14,400 kc.; expansion of 75 phone to 3,750–4,000 kc.; denial of the League's request for a 16 w.p.m. Class A code test and denial of the League's request for a restriction on Class B and Class C licenses during the first year of such licenses.

The SARA petitioned FCC for rulemaking, too, requesting that the 75-meter band be held at 3850–4000 kc. and that no expansion of phone be made in 20 or 10 meters. It asked that s.s.b. be permitted to share all phone bands, and that segments be set aside for sideband-only at 3850-3875, 14,285–14,300 and 28,500–28,525 kc. The SARA endorsed the League's idea for a Class A code test, but thought it should be at 20 w.p.m. and should also be required for Class A renewals. The Society also thought that all licensees should be required to spend a year on c.w., and that two years' experience should be required before permitting a Class B C amateur to attempt the Class A exam. It also proposed a new temporary license (six months to a year) with relaxed code and written requirements, nonrenewable, code-only on 3.7–3.8, 7.2–7.3 and 145–148 Mc., crystal control required.

Thus we see that ardent exponents of both voice and code were simultaneously dissatisfied with the League's "mainstream" actions, and set up their own specialized organizations, each moving diametrically opposed to the other.

In the meantime, an FCC reorganization had placed amateur affairs for the first time in a virtually-autonomous branch of the Safety and Special Service Bureau. Unhampered by pressures from other duties, therefore, Amateur Branch personnel devoted a great deal of time to their own study and evaluation of amateur radio and what they saw as its problems. The result was that, when the Commission did announce a Notice of Proposed Rulemaking, it hit amateur radio like a bombshell. Borrowing from all three proposals, the FCC suggested:

A new Basis and Purpose section, implying if not stating a degree of FCC control over the future course of amateur radio.

Creation of three new classes — Amateur Extra, Technician, and Novice — and renaming Classes A, B and C as Advanced, General and Conditional respectively.

Providing for the elimination, after a certain date in the future, of Class A (Advanced Class) licenses, either by voluntary testing and promotion thereby to Extra Class or by renewing these licenses as Class B (General Class).

A new section of 75 phone, 3800–3850 kc, on which bandwidth would be limited to 3 kc.; a bandwidth limit of 6 kc. for the remainder of 75 and all of the 20-meter phone band, both bands limited to holders of Advanced and the new Amateur Extra Class license.

An RTTY band on 10 meters, a 10-kc. bandwidth for phone in most of the band, and 6 kc. bandwidth at the high end.

A new renewal procedure specifying 50 hours of operation within the license term or ten hours in the final six months and an affirmation of ability to copy code at 20, 13 or five w.p.m. depending upon class of license.

A new rule requiring a net control station in any communication involving more than two stations at a time.

Amateurs were greatly alarmed at various parts of the Docket, depending in part on their own individual interests. The League reacted most strongly to the general principle implied by the docket that henceforth new trends, new courses, new goals in amateur radio would come from the Commission staff rather than from spontaneous generation in the field, with later competition against other ideas and selection by the freely-elected representatives of amateurs. In addition, some of the concrete proposals, such as washing out the Class A in favor of the Extra, imposing a compulsory bandwidth and requiring that all round tables be formalized — were thought to be contrary to amateur history and needs, and were thus unacceptable to ARRL. Subsequently, the League withdrew its proposals of 1948 and filed its opposition to Docket 9295 on the grounds that the philosophy behind the changes was all wrong — even though, in some cases, the concrete proposals were close to those the Board had made a year earlier.

The SARA accepted most of Docket 9295, opposing only expansion of phone bands. The NARC supported most of Docket 9295, though opposing the Extra Class license-upgrading proposals.

A preliminary meeting with FCC personnel in July set the stage for an informal engineering conference held on October 10, 1949. A special meeting of the Board held the 8th in Washington authorized a shift in ARRL position: if the philosophy were to be written out of the rules, ARRL could accept most of the "nuts and bolts" of the change. Its officers even came up with a Basis and Purpose section close to that proposed by FCC, but with phraseology less offensive to those who felt the amateur should steer his own ship. The conference was marked by great harmony of purpose, and a common set of objectives was adopted by ARRL, SARA and NARC with FCC officials at the October 10 meeting. The "Great Compromise" was widely acclaimed by all amateurs.

In November the Commission released its "Further Notice of Proposes Rulemaking" in Docket 9295 embodying many of the compromise decisions. Thus it was now proposed to keep 40 and 20 as they were, to provide 50 kc. additional phone in 80, to allow n.f.m. permanently in the 20 and 80 meter bands and to provide for RTTY on 10. The new classes were to be adopted, and the name changes were considered acceptable. The Advanced Class was proposed to be continued for present licensees; it would not be available to new applicants after December 31, 1951. The renewal proposal was carried forward, but in scaled-down form; the November version called for two hours operating time in the last three months or five hours in the last year of the license term.

The League's suggested language for a Basis and Purpose section was adopted — except that a few more words had been added. The result was that this section still expressed a philosophy of government direction and control unacceptable to the Board. Thus, ARRL continued to fight Docket 9295, insisting on an Oral Argument on principle. The other two groups accepted the revised proposals, and even filed statements applauding the work, and chiding the League for its failure to accept a document they said was very little different in substance from that which had been approved at the October 10 meeting. SARA moved for immediate adoption of the November document, while NARC wanted a formal hearing and a poll by FCC, which presumably would have showed the amateurs in favor of the FCC plan except for its Extra Class proposal, on which results were not predicted though NARC agreed to abide by these results. FCC turned down both the request for hearing and the request for a poll, but accepted the request for oral argument, which was held, after delays, on June 2, 1950. The ARRL oral arguments (on the philosophy only, since the "nuts and bolts" were acceptable) convinced only two of the Commissioners: on January 31, 1951, the majority of the Commission adopted the revised Docket 9295 substantially as issued in November, 1949.

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While Docket 9295 occupied center stage, other changes in domestic rules went on. In April 1949, the Canadian DOT and the FCC jointly authorized operation in the 160-meter band for the first time since the war. The rules differed only in detail from the rules presently in force, under which the Loran system has priority and is protected from interference by amateurs. The Canadians also authorized narrow-band f.m. on all phone frequencies about the same time. U.S. action in this respect did not come until 1952. The Citizens' Radio Service was created effective June 1, 1949, with frequencies in the band 460–470 Mc.

A "ban list" of countries objecting to international communications by their amateurs was released by FCC in November 1950 containing eight names — Indonesia, Japan, Indochina, Iran, Lebanon, Netherlands Antilles, Thailand and Austria; FCC backed up the list by issuing advisory notices to amateurs heard in violation.

Looking at the call letter license plates issued in Florida in 1950 are C. Ralph Dawson (left), and Senator Lloyd F. Boyle, W4IMJ, sponsor of the legislation.

The Korean War posed some slight threats to the U.S. amateur service, but government-amateur liaison in Washington proved to be good enough to solve all the problems without forcing amateurs off the air or subjecting them to restrictions. At League request, G.I.s were permitted to renew their licenses without fulfilling the "proof of use" requirements. In 1951, the press reported that amateur operations had interferred with tank communications in Korea. It turned out that the Army was using some ten-meter frequencies; when the band opened up, State-side hams could be heard. Prompt action by the League counteracted the potentially-bad public reaction; the Army, of course, adjusted its Korean operating frequencies to prevent recurrance and publicly supported the amateurs.

Much discussion went on about new rules to protect aviation from high radio towers. The original proposals were too broad to be applied to amateurs, and the proposed form, too complicated. After considerable effort by ARRL, the

Ross Bateman, W4AO (left) and Bill Smith, W3GKP, shown working on *Project Moonbeam.*

rules as concerned amateurs were simplified, and the Form 401-A streamlined. The biggest gain was a provision that an antenna which was added to an existing structure and did not increase its height by more than twenty feet was exempt from regulation, regardless of its location.

One of the outstanding examples of amateur self-policing occurred during August and September 1951, wherein amateurs East of the Mississippi voluntarily abstained from nighttime operation in the frequencies 3700-3900 kc. to provide extra frequencies to the Army for war games in the Southeast states. The amateur cooperation wasn't haphazard, however; there were three advance warnings in *QST*; special bulletins were mailed to dealers, to ARRL appointees, to net control stations and to official observers East of the Mississippi. In addition, eastern official bulletin stations transmitted a sunset warning message and headquarters amateurs maintained a listening watch.

FCC in December, 1951, proposed that persons holding or able to qualify for a General license be granted the Extra Class license without further examination if they could show that they had been licensed prior to April 12, 1917. Only two weeks was allowed for comment, and shortly thereafter, in January 1952, the "grandfather clause" became effective.

Several additional rules changes came up in early 1952. The segment 14.35–14.4 Mc. was withdrawn from amateur use in accordance with the Atlantic City allocation, and the 15-meter band became available for the first time. F-1 was proposed for the c.w. portions of 80, 40 and 20, and later 15 was added. Phone privileges were added on frequencies 7.2–7.3 Mc. Novices secured frequencies 7175–7200 kc. Again the League asked that Class A be continued (as Advanced Class) both for present and new holders. The Commission again refused, but instead, offered to do away with restricted phone bands altogether! Though amateur comments in the docket ran more than 8 to 1 against the FCC idea, the proposal was adopted effective in February 1953 — and was destined to have repurcussions ten years later in the current incentive-licensing discussions.

In the summer of 1952, FCC proposed calling and emergency channels within the amateur bands, to be unavailable for other purposes. The League opposed the proposal in strong terms, pointing out that the Commission had not had to use its policing powers in 25 major and 133 minor emergencies reported in *QST* in the previous eight years. The ARRL filing also contained an alternate proposal to modernize the Commission's emergency powers where needed; this proposal was accepted by the FCC and is the essence of our Section 97.107 today. Canadian amateurs secured their 15-meter phone subband, 21.2-21.45 Mc. in July 1952, and their 40-meter phone band, 7.2-7.3 Mc. in January, 1953. The 15-meter phone band, 15-meter Novice band and RTTY privileges all became effective for U. S. amateurs early in 1953. The 11-meter Novice band was withdrawn at that time. Discussions were started looking toward Conelrad observance by amateurs. FCC also proposed that the 125-mile "license by mail" circle be reduced to 50 miles, that Novice and Technician exams be given only by mail, and that maritime mobile operation on the high seas be permitted within the 15-meter band. All were eventually adopted except that the circle was reduced only to 75 miles.

League Affairs

After a very thorough study of every conceivable angle, the Board of Directors in 1949 decided to buy the property at 38 LaSalle Road, West Hartford; the League had leased the building as its headquarters since 1931.

A. L. Budlong was elected as Secretary and General Manager in 1949, replacing the late K. B. Warner. The elections for president and vice president in 1950, however, were spirited: After three ballots, W. M. "Soupy" Groves, W5NW,

Sidelights, 1949–1953

The Citizens Radio Service was established in June, 1949, with frequencies in the 460–470 Mc. band. . . . The U. S. House of Representatives passed the Coudert resolution commending amateurs for their emergency services. . . . The ARRL Board created the position of Assistant Communications Manager, Phone; Lewis G. McCoy, W6ICP, came east to fill it. . . . The Board asked for a Commemorative Stamp featuring amateur radio. . . . Florida provided call letter license plates in a bill ramrodded through the legislature by W4HMJ, a State Senator. . . . The radio program, "This is Your Life" on January 4, 1950 featured Robert Gunderson, W2JIO, editor of the *Braille Technical Press*. . . . A National ARRL Convention was held at Seattle July 27–29, 1951. . . . Amateurs reported having trouble getting photocopies of licenses; ARRL secured an amendment to the FCC rules making it clear that photocopying is permissable. . . . FCC shifted the grading of license tests back to its field offices. . . . Early in 1951 ARRL produced a booklet, "Getting Publicity for Your Club and Amateur Radio". . . . The Disaster Radio Service was created, effective March 21, 1951. The DRS, which operates on 1750–1800 kc., is a meeting-ground for emergency operations by licensees of varied radio services, including amateur. . . . U. S. publishers were barred in 1951 from sending technical literature to "Iron Curtain" countries; this included all League publications. . . . The ARRL Board authorized the start of a *QST* column for YLs, on a regular basis with a paid contributing editor. . . . A pamphlet to interest the general public in amateur radio, "You Can Be There", was published by the League. . . . F. E. Handy, W1BDI, was elected a vice president under the 1951 Articles of Association which permitted up to three VPs. . . . FCC adopted automatic extension of license terms where timely application for renewal has been filed. This removed a hardship on amateurs in those periods when the Commission had a backlog of applications. . . . Radio parts were scarce at times during the Korean action; amateurs were granted a priority rating by the National Production Authority. . . . Captain Kurt Carlsen, W2ZXM, brought fame to the amateur service when he stayed aboard the sinking *Flying Enterprise* and used his ham radio equipment when the ship's gear failed. . . . FCC Form 405-A was to be used for 'straight' renewals of amateur licenses after April 15, 1952. . . . Cooperation between FCC staff and the League resulted in provision for "Special Temporary Authority" for qualified amateurs to do propagation studies, atmospheric soundings and the like not ordinarily provided for in the rules. . . . The Board in 1953 created The ARRL Merit Award to be presented annually to an amateur for technical achievement. . . . Another National Convention was held in Houston July 10–12, 1953. . . . Three 1953 candidates for League office, declared ineligible for lack of membership continuity, tested the 1951 Articles in court; the court upheld the League and its Executive Committee on each count in a decision announced early in 1954. . . . W1AW damaged by fire, but no schedules had to be cancelled; damage was confined by fire-stop construction and other safety features to a small area under the tape perforator.

defeated J. L. McCargar, W6EY to become vice president. The fight for the presidency was even tougher: after an 8 to 8 tie for 13 ballots, G. L. Dosland WØTSN withdrew and George W. Bailey, W2KH, was then reelected. Two years later, Mr. Dosland won the rematch and became president.

A committee appointed in 1950 to revise the League Constitution brought in the text of the present Articles of Association which were then adopted by the 1951 Board. The next year, a new set of By-Laws in consonance with the new Articles was adopted by the Board.

Throughout this period, the General Counsel was active in local legal matters. Two historic cases were won by the amateurs and the League, *Wright v. Vogt* in the Supreme Court of New Jersey and the *Appeal of Lord* in the Supreme Court of Pennsylvania, both affirming amateurs' right to an antenna structure in connection with an amateur station as a use customarily incidental to residential use of property.

After three years of League effort on both sides of the border, a treaty between the U.S. and Canada was signed and ratified by the respective governments permitting the amateurs of one country to operate their amateur stations while visiting in the other country. The treaty also dealt with other radio services, such as taxicabs, and went into effect in the summer of 1952.

On the international front, the Fourth Inter American Regional Conference and Region II Radio Conference (within the framework of the International Telecommunications Union) were held simultaneously in Washington, D. C. As is customary, the League had been involved in all preparations for the conference, and had representatives on the American delegation. The big struggle of the conferences was the desire of the U. S. and Canada to have 3.5-4.0 Mcs. exclusively amateur in this hemisphere, as against the wishes of other countries, with small amateur populations, to use the band for fixed and mobile services as well (as is permitted internationally under every Convention since the first at Washington in 1927). The matter was settled in theory by an allocation table assigning the band to amateurs, but permitting fixed and mobile services on a noninterference basis. In practice, nothing was settled at all, for six countries took reservations, and one — Argentina — in so doing declared that the allocation violated the Atlantic City agreement and therefore was unacceptable.

In 1951, at an Extraordinary Administrative Radio Conference, the 80-meter matter which had been glossed over at Washington erupted again; the U. S. delegation asked for Secretary Budlong to come to Geneva. Lots of time was spent behind the scenes, and finally a resolution was adopted which said that each country would make its own assignment in the band, and would accept unavoidable interference from other countries.

The period of 1949–1953 can be summarized as one with a minimum of threats to the amateur service from without, and a good deal of turbulence within. All the same, it saw our amateur regulations modernized in many respects, saw the reduction of TVI as a major threat to amateurs, saw the establishment of legal barriers to the indiscriminate action of municipalities against hams, and saw the nation involved in a military emergency of considerable magnitude, without having to discontinue amateur operation.

THERE were many good v.h.f. openings in '50. However, a definite deterioration was setting in in the 10-meter range and conditions on other bands were becoming increasingly spotty. The National Traffic System was constantly becoming more useful in handling our relay traffic. Mobile work was coming to the fore. The WAS and DXCC awards were highly popular for those times, though there were not as many amateurs and issuances were at about half the present rates. RTTY and s.s.b. continued on the increase.

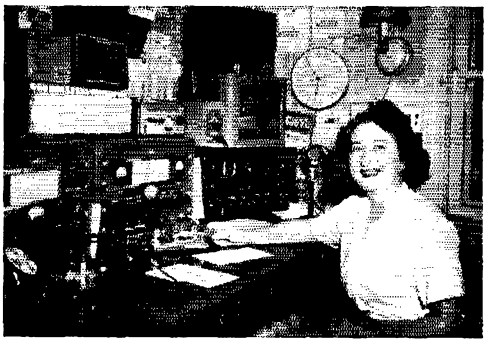
As a new service W1AW added low-speed code practice ranges, extending such operations to all seven days of the week. Code Proficiency Certifications were now issued starting for the first time at speeds as low as 10 w.p.m. The traffic interest of amateurs had moved steadily forward in the period '46 to '49. It now halted on a plateau in '51 to '52; then it moved on up to new heights in the next three and four years.

The League's Code Proficiency Program now embraced the Novice requirements and in '52 it commanded an increasing interest while continuing to cover the higher achievement speeds. The year saw CP Certifications hit a level 70% above previous annual records. The 21-Mc. band, opened in May, commanded high attention from operators; it was a "hot" DX band and widely acclaimed. The Field Day hit a new high.

As a result of League efforts we now had registered with ARRL Emergency Coordinators some 32,000 AREC members. A survey to look at the potential for communications indicated that 43% of these were able to operate mobile. Unfortunately the government was slow in getting the RACES rules out, following their '51 adoption. As a consequence interest waned somewhat. When finally published the first FCC-RACES authorizations were to W3PWB, W3NL and W3ECP.

A seventh Governors'-President Relay was an outstanding success. Forty-eight states reported,

W1KOO, the Control Center Station in Chittenden and Grand Isle Counties, Vt., during the SET of 1958.



Mae Burke, W3CUL, shown here in 1950, made BPL every month of that year.

forty-seven were heard from by radio and forty-six of the Governor's sent messages. Also in '53 the Official Observer activity hit a pace of 2000 advisory notices sent for the first time. RCC kept its top position of popularity among the various awards. The number of RTTY users had constantly increased. For the first time W6AEE's *RTTY* carried an announcement of a radioteletype Sweepstakes. The general pattern was similar to ARRL's November Sweepstakes and this activity got off to a fine start.

W3GKP and W4AO in January 1953 bounced their two-meter signals off the moon. This success followed a long series of trials and was an exacting proposition using 20-wavelength rhombics.

Under the chairmanship of W2JZX a cross-country net set up was organized for a special purpose. With many cooperating operators and the help of the Los Angeles YLRL, the communications for participants in the Seventh Annual All-Women's Transcontinental Air Race was a success! In this era ARRL Section and state-wide QSO parties were increasingly popular. Several different ARRL Sections (Conn., N.H., Ohio, Ontario, Va., Vt., and W. Va.) had such radio get togethers with fine fraternal success and the Rocky Mountain Division made its activity a division-wide party.

The Novice Roundup, a new activity that had been started in '52, continued a helpful and popular activity. It helped unite old timers and newcomers and was a step in contributing to the skill of the latter. In 1953 more DX tests were held by the 160-meter gang; another 10-meter WAS Contest was scheduled and turned out a fair success but conditions were erratic. The leading station, W7PUM, however, worked some forty-two states. VS5ELA Planned an "expedition to Brunei". This had a "new DX" appeal: he made some 232 contacts, over half with W-stations. Easter Island was put on the air in August 1953 when CE3AG setup as CEØAA. In about seventy hours on-the-air he made 1538 QSOs with fifty-three countries! Still another

highlight in DXpeditioning is fully recounted in the *QST* story of FOØAJ, detailing the WØNWX operation from Clipperton Island.

Relaying came into its own again. This time it was a culmination of many earlier partial routings looking to the success of a *coast-to-coast v.h.f. relay*. An all two-meter circuit was proved adequate for the job. Operators dedicated to keeping hourly schedules around the clock, mimeographed listings of potential routes and high enthusiasm made this Memorial Day week-end of '53 go down in history for a new first in relaying.

The League's Board in '54 directed provisions for a Traffic Medallion to recognize continuing interest and consistent BPL size totals in public service message handling efforts. This recognition is available to any W/VE amateur after his third BPL-size total, reported to his SCM.

Civil defense organizing steadily gained ground in this period. Hundreds of RACES plans were filed. State and national civil defense tests now embraced amateur communications, both RACES and RACES with AREC helping.

Operation Alert in June '54 was made a special exercise for ARRL Emergency Coordinators. Hundreds of ECs reported the participation of thousand of amateurs and the operation of over 1700 stations (738 portable and 63 hand-carried among these) in the nation-wide test. The performance turned in by amateurs was given due credit and recognition by c.d. administrators.

By early '55 the propagation cycle was in a fast upswing. 2600 had now qualified post-war for DXCC. Field Days (June) were progressively bigger. On v.h.f. there was new excitement. The 10,000 MC. line-of-sight DX record was set and broken three different times in the year, ending up at 109 miles. RACES's plans continued to pile up. Amateurs in the civil defense regions were formulating recommendations for systematic use of frequencies, making necessary area provisions to minimize interference and get the most from the v.h.f. and h.f. frequencies earmarked for RACES. Applications for the leading awards, WAS and DXCC, were in a pronounced upswing. S.s.b. operation was becoming more popular. Half the ARRL clubs now indicated having some s.s.b. users. There were but 883 active affiliated clubs on the League's lists. Our

Luis Desmaras, CE3AG, was the highest South American c.w. scorer in the 19th ARRL DX Contest. He also put Easter Island on the air in August 1953, using the call CEØAA.

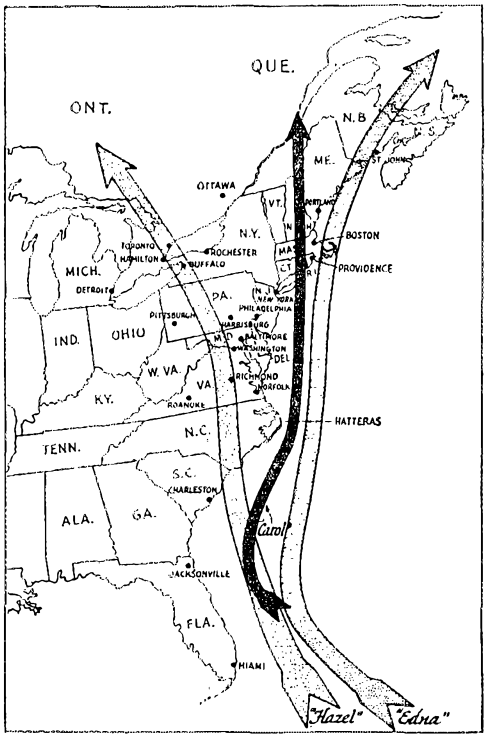
21st annual ARRL DX competition in '55 showed gains in participation for the *fourth straight year*. The 22nd ARRL Sweepstakes (up 5%) broke all previous participation records. The Novice Roundup (fourth one) showed a 250% increase from the first one. The v.h.f.-SS was up 22%. All in all, this operating of twenty years ago was highly attractive, even as today.

Also reminiscent of earlier two-way work with KJTY-WHEW in the Byrd Antarctic Expedition of '34 was the 1955 departure of seven Navy ships to establish several bases in the Antartic. Operation *Deepfreeze* and the operations at KC4USA and KC4USV were in preparation for the International Geophysical Year and scientific work over the next four or five years. Bud Waite, W2ZK, was leader of a Signal Corps group. In connection with the larger Antarctic program Commander Snay, K4GFR, reported thirty to forty amateurs included in this expedition's roster! Work with the KC4s was assured, and bound to be glamorous and interesting — and public service for the many men isolated from their homes in the long winter night.

Emergency Communications

THE re-emergence of civil defense on the national scene was brought about by international events, particularly the unveiling of an atomic "device" by an unfriendly Russia. U. S. government officials predicted this as early as a year or two following VJ Day, and already had started studies on c.d. subjects. ARRL was associated with these from the very start, first with the so-called Hopley c.d. planning group, then with the c.d. plan of the National Security Resources Board, and finally with the newly-created Federal Civil Defense Administration and, as always, the FCC.

An excellently-written editorial in *QST* for December, 1950, clearly delineated the problem. Its summary of background and prospects for utilization of amateurs in the future for this type of emergency communication (i.e., civil defense) is useful reading even today. "Remember," concludes this editorial, "that we now have two jobs on our hands — civil defense communications and peacetime emergency communications. The requirements are not the same, the frequencies required are not the same — and for peacetime emergency work there is no question of security or availability to argue against



A hurricane every month was the story in 1954 when these three whirlers roared up the Atlantic Coast in August, September and October.

use of any of our frequency bands. Preparation for one, therefore, is not necessarily adequate preparation for the other. From now on, we must prepare for both."

With this in mind, discussions were begun at government (FCC and FCDA) working levels looking toward a new amateur service aimed at civil defense communications. The League's General Manager, Communications Manager and National Emergency Coordinator were all involved, the two latter spending a full week taking a course in basic civil defense with emphasis on communications and another week at a c.d. communications conference. Prior to and subsequent to this, very close contact was maintained with FCDA communications officials. In the early months of 1952 the new service was unveiled, the Radio Amateur Civil Emergency Services, RACES.

The period from 1950 to 1955 might be described as "the RACES boom years." Motivated partly by nervous agitation, partly by patriotic fervor, the nation's amateurs rallied to RACES and the call to national defense which it implied. The AREC was dedicated to the origination and implementation of the RACES program at local levels. ARRL headquarters officials were invited to sit in at conferences of FCDA communications officials all over the country, and few such invitations were turned down. QST's table of contents reflected the trend in this direction as well. W2BGO, c.d. radio officer for New York State, organized the Northeastern States Civil Defense Amateur Radio Alliance, which later became the U.S.C.D.A.R.A., and the League was a participating observer. This group put out a complete RACES Operating Manual which was printed at the behest of FCDA by the Government Printing Office, and later was instrumental in fostering a master plan for frequency allocations in RACES.

Meanwhile, QST carried articles on RACES organizational and technical subjects, and the League put out bulletins to its leadership officials outlining policies and procedures and giving facts and figures. During these near-frantic years of preparation which fortunately did not prove required as soon as our national leaders had feared, it was even proposed by many that the League abandon its own AREC and rely entirely on RACES for amateur radio emergency communication, both in peace and war.

While we were all busily preparing for man-made disaster, Mother Nature continued her occasional manifestations of fury. In November of 1950 the north Atlantic coast was visited by a "land hurricane" which extended far inland. In January, an ice storm hit hard in the Ohio and Mississippi River Valleys. Again in late January and early February freezing rain, sleet and snow created communications problems in the near and mid-south. In June unprecedented floods hit the Kansas City area, resulting in an operation so extensive as to merit up-front *QST* mention.[1] In January of 1952 another Ohio River flood took place. In March a series of tornadoes leveled communications facilities in large areas of Arkansas and Tennessee. In April severe flooding hit the north midwest. In July an earthquake struck the Tehachapi, Calif., area. In late November a severe snowstorm hit large areas of Va., Tenn. and Ky., and later large areas of

[1] "Water in the Dust Bowl," Nov. '51 *QST*.

A little shaken up but still game are W2TII and W6LYF after having observed an atomic bomb explosion from 10,000 feet in Nevada during the joint AEC/FCDA "Operation Cue." An ARRL observer was also present to observe communications problems.

Kansas were snowbound. In May of '53 it was tornadoes in Texas, and in June twin tornadoes leveled areas of Flint, Mich., and Worcester, Mass.

A period of relative calm followed — that is, there were no really devastating emergencies. Then, in August, September and October of 1954, three hurricanes formed in the Caribbean and headed northward, all three missing Florida but striking inland at various points to the north. And to wind up 1955 with a bang, we had "The Great Flood of 1955," a deluge from dying Hurricane Diane which completely inundated the northeastern states causing unprecedented damage and death. Amateurs were vital in all these and other disasters during the first half of the decade.

Both the AREC and RACES participated in most of these activities, sometimes together, sometimes separate, often one without the other. Where RACES was organized, it usually superseded AREC; where it was not, AREC did very well without it. In a few places, the two organizations, separate yet overlapping, worked together ideally as they were intended to do.

We have one more historical installment. After that, events can better be labeled "recent activities" and perhaps we can take a look into the crystal ball.

Technical Progress

In early 1950 the single biggest fact facing most of the U.S. amateurs was TVI. Literally thousands of amateurs around the country were becoming aware of this threat to their previous relative freedom if not to their very existence. Every month *QST* carried one or more articles on TVI reduction and elimination, but all of the solutions involved work, not a single magic panacea as some hoped for. Articles covering low-pass filter design, the proper use of bypass capacitors and of shielding, and the advantages of the pi-network tank circuit drew the most attention. Mack Seybold, W2RYT, discussed his long-term investigation of stray rectification and won an annual award for his thorough efforts.

Phil Rand, W1DBM, lectured on and actually demonstrated the various causes of and solutions to TVI before a number of ham gatherings during 1953. His sometime assistant, Lew McCoy of ARRL Headquarters, carried on the work with the "League TVI demonstration" before serviceman and amateur groups. The largest group was 1200 interested spectators, in Chicago. This work was done at League expense, with excellent cooperation from RCA and the FCC. During '53 and '54, over 50 cities were visited, by air and by station wagon. The demonstrations served to inspire many amateurs to tackle and lick the problem, and they also helped to show that TVI was a two-way responsibility, shared by the set owner and the amateur.

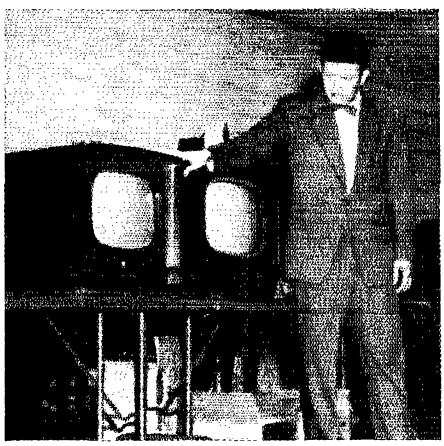
In 1954 F. E. Ladd, W2IDZ, told of his experiences in licking one of the worst TVI problems: 50-Mc. operation in a Channel-2 area. By the end of 1955 the TVI solution had been fairly well defined by the triumvirate of Grammer, Rand and Seybold, with assists from countless others.

Receivers

In 1950 commercial "communications" receivers were following the old line of a single crystal filter at 455 kc., although r.f. image rejection was being improved through the use of double conversion. A few amateurs, sensing the need for better adjacent-channel selectivity, had described high-selectivity receivers in the late '40s, and a symposium of a number of homemade receivers in the January, 1951, *QST* showed the definite trend.

The ultimate in skirt selectivity was described by John Kaye in "One Db. per Cycle!" in November, 1951. This super-selective receiver used a third i.f. at 20 kc., following i.f. amplifiers at 6.0 and 0.455 Mc. The 20-kc. amplifier used 12 tuned circuits; the bandwidth at −6 db. was 235 cycles, increasing to 395 cycles at −90 db.! A multigrid conversion detector was used (after a 1948 Villard article) without the benefit of the "product detector" designation that was to dignify the same detector in the late '50s and give it great commercial value.

Receiver manufacturers finally took notice of the desire for more selectivity, and receivers began to appear with more sophisticated selectivity than a single crystal filter. The "mechanical filter" became commercially available in 1953, although its construction had been described by Adler in *Electronics* some five years earlier. The "Collins" mechanical filter gave selectivity a boost at 455 kc., in contrast to that furnished at lower frequencies by cascaded tuned circuits.



Lew McCoy, W1ICP, helping to make the world safe for Kukla, Fran and Ollie and "Hello test!"

In April, 1953, Bob Ehrlich, W2NJR, described a rather sophisticated homemade receiver designed expressly for s.s.b. reception. It featured an 8-crystal double-lattice crystal filter

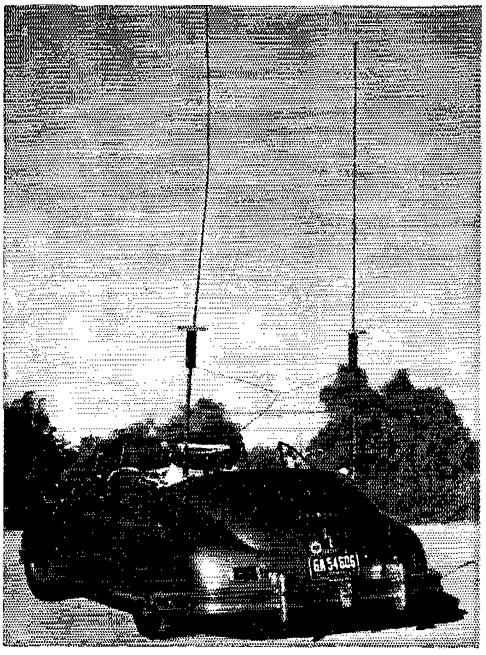
and "selectable sideband" that shifted the high-frequency oscillator and the b.f.o. simultaneously by the same number of cycles. This variation of the McLaughlin principle was a considerable simplification.

The rapidly-increasing signal density in the more popular bands made "cross modulation" a growing source of interference generated *within* the receiver, and attention was drawn to it by an article in January, 1955.

The interference levels in the amateur bands increased rapidly during the early and mid '50s, undoubtedly helped by the introduction of the Novice license in 1951 and the subsequent modification of the regulations to permit more licensed amateurs to conduct the examinations.

Mobile

Interest in mobile operation ran high during 1950 through '55, for two reasons. The revised regulations permitting mobile operation on any band were relatively new, so there was the thrill and fun of investigating a different field. The second reason was not as readily admissible, but mobile operation was one way to run away from the problem of TVI. Whatever the motive, however, a number of good portable designs were completed during the period, with power supplies using vibrators or war-surplus generators. Low-frequency antenna work concentrated on the center-loaded whip, although large loops came in for considerable investigation. The desire for multiband operation led to tapped coils and also to two-band tuned networks (Pichitino, June, 1953). The ultimate, however, was a mobile antenna described by Hargrave in May, 1955, that adjusted itself *automatically*, using a motor-driven capacitor and a phase-sensitive detector.



In a January, 1952, article entitled "75-Meter Mobile, California Style," W6ZV entertained the reader with his account of personal problems and solutions encountered with a mobile kilowatt. One of the problems was antenna corona and loading-coil disintegration, solved by using ball tips and two antennas. The caption read: "The high-power mobile antenna of W6ZV is a potent putter-outer and a real attention-getter."

Antennas and Propagation

Two minor trends in 20-meter beam antennas started in 1954 and 1955. Compact 20-meter beams (center-loaded and end-loaded) were described in 1954 and in March, 1955, the multi-band "trap" beam was described by Buchanan, W3DZZ. During the same period, v.h.f. beams moved in the logical direction: more and more elements, and "flopover" arrays for observing polarization effects.

Reporting on work done at Stanford University in 1952, O.G. Villard described the "scatter-sounding" experiments that permitting telling in which directions a band was open even when no amateur signals were coming through! The following year he told of confirmed "meteor scatter" propagation on 14 and 21 Mc.

Keys and Phone

Development in c.w. techniques continued in the line of better electronic automatic keys. Bartlett, Brann and Turrin made worthwhile contributions in improving the consistency of operation and in circuit simplification. In February, 1953, John Kaye described the first of several "Ultimatic" keys, the "key with a memory." This electronic marvel was actually capable of storing in its memory a dot (or a dash), even though a dash (or a dot) was being sent at the instant of storage. Kaye worked out techniques that permitted smoother and more perfect code to be sent with this principle and a two-bladed paddle. Later models were all-electronic the first used *six* relays) and transistorized.

Power supplies received some attention when George Grammer expounded the principle of the "economy" power supply (November, 1952), pointing out that most supplies were not being used at full capacity. And during the early part of the same year "Rothman Modulation" was described. Surrounded by a slight amount of mumbo-jumbo during its first demonstration at a national convention, it was nevertheless, a simple and excellent form of controlled-carrier a.m. However, it suffered the fate of all previous controlled-carrier a.m. systems. Its feature was the use of rectified output r.f. to furnish the d.c. screen power of a screen-modulated amplifier stage; the audio power was furnished by a low-powered modulator.

V.H.F.

In the v.h.f. field, the use of overtone crystals for frequency control was gradually becoming standard. Commercial crystals ground for good overtone operation became available, eliminating the need for the special circuits of the late '40s. Interest in amateur TV (on 420 Mc.) was be-

ginning to appear. V.h.f. equipment was becoming more refined, making use of new tubes and techniques. External-anode transmitting tubes were available, and they lent themselves well to designs using coaxial tank circuits.

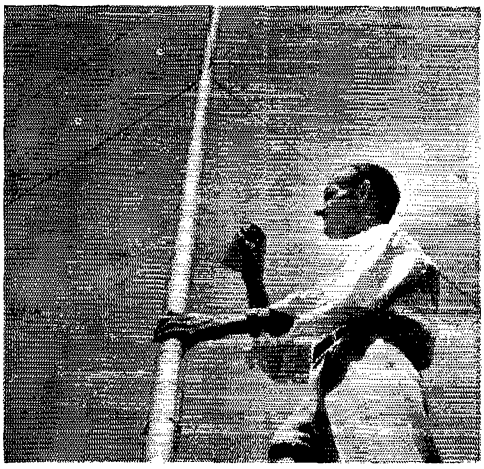
Although terrestrial DX records were being made only to be broken, perhaps the outstanding achievement was the 144-Mc. "moonbounce" work of Ross Bateman, W4AO, and Bill Smith, W3GKP. After *three* years of work improving antenna gain, receiver noise figure, and frequency accuracy, on January 27, 1953, they recorded a long string of pulses *reflected* by the moon. Although this was not the first time the feat had been accomplished (the Signal Corps had done it in 1946 on 110 Mc.), it was the first amateur success with amateur gear and a kilowatt power limit.

Single Sideband

On the sideband front, things progressed slowly and not necessarily smoothly. Millen brought out a commercial audio phase-shift network in early 1951 that gave a boost to the homemade phasing-type exciter. By the end of 1952 most of the sideband rigs were homemade phasing rigs, or filter units based on a 455-kc. crystal design of Edmunds, W1JEO, or one of several lower-frequency *LC* filter designs.

The first commercial sideband unit, the Central Electronics 10A, was finding acceptance. The success of the 10A can be attributed to its realistic pricing and to the leg work of Wes Schum, W9DYV. Starting out as a basement operation, Central Electronics grew to a sizeable company during the next six or eight years. But it was Schum himself, visiting radio clubs and conventions, who "sold the medicine."

In May, 1951, Ed Nowak, W1FAJ, described "Voice-Controlled Break-In — with a Loudspeaker!" and ham radio was never to be the same again (although it took a few years). In June and August, 1951, a pair of articles by Weaver and Brown described a straightforward approach to 455-kc. crystal-lattice filters, to sound the death knell of any lower frequency filters. In August, 1952, Dick Long, W3ASW, an early and loyal sideband pioneer, described the remote-tuned v.f.o., to introduce a technique that could be applied for frequency control of any kind of transmitter. Some of the mystery of linear-amplifier adjustment was cleared away by a well-illustrated article by Bob Ehrlich, W2NJR, in May, 1952. The many photographs showed what 'scope patterns should — and should not — look like. Electronic t.r. switches were being refined and improved during this period, and the Crosby "product detector" was duly noted in the May, 1952, "On the Air With Single Sideband" column.



The "Budget 7-Mc. Vertical Antenna" described in November, 1955, was a tongue-in-cheek but nevertheless practical description of a beer-can vertical. The caption to this illustration read, "Here W2JTJ is touching up a spot on his antenna he missed with the aluminum paint the first time around. A lot of thought and libation went into the construction of this vertical."

At the start of 1953 there were about 300 active sideband stations, but even in 1954 there were letters to *QST*'s editor complaining that "sideband is being shoved down our throats." It was not a valid criticism; early in 1954 *QST*'s sideband column was discontinued because it was believed that the mode had already proved itself and needed no encouragement. Few if any operators who tried s.s.b. went back to a.m. except to work their old buddies who had not yet learned how to tune in the "Donald Ducks."

The tide turned in 1954. At the Trade Show in May, a number of manufacturers for the first time showed s.s.b. transmitting and receiving equipment and accessories. Somewhere along the line a rumor was started, but not confirmed until early the following year, that Collins was *discontinuing* high-level plate-modulated a.m. equipment and concentrating on single-sideband transmission, with or without carrier. A decision like this by a leader *must* be sound, it was reasoned, and the sheep followed faithfully, although perhaps a little reluctantly.

S.S.B. Comes of Age

From 1951 through 1955 the good guy s.s.b. tucked in his sideband and got to work while the bad guy TVI was taking a bigger beating each year.

The hero's helpers included McLaughlin's Signal Splitter, 1952; Gonset's Signal Slicer, 1953; the Burnell filter and the B&W 51SB, 1954; Lakeshore's Signal Splitter and B&W's 370 Adapter, 1955. However, Central Electronics is generally credited with giving the initial push that got s.s.b. off the ground. The ad on the 10A appeared in September of 1952; it was the first on a complete piece of s.s.b. transmitting equipment.

Through 1953, 1954 and 1955, s.s.b. advertising increased substantially. For the last three

months of 1954 the Collins ads were devoted to technical talks on the subject. In February of 1955 one more talk appeared and in March the company gave s.s.b. the second big boost it needed — Collins practically abandoned a.m. with the announcement of the 32W-1 and the KWS-1.

Central Electronics brought out the 20A and the 10B in December 1953. The "Why Fight It?" ad in July 1954 was indeed prophetic. It declared that "single sideband is here to stay!" The word *single* was to attain prominence again. In the thirties it had been single signal; now it was single sideband.

Lakeshore introduced the Phasemaster Jr. and the P-500 in 1954, Elenco the 400-T3. In 1955 Petersen showed crystals for s.s.b. Hallicrafters announced the SX-96 receiver and the HT-31 linear amplifier. Linears were also brought out by Adams, Eldico, Transitron, Eldico offering the SSB-100 transmitter, too.

TVI troubles still existed, but as Drake said in February of 1952: "TVI is on the run!" Advertisements on transmitters like WRL's Globe King and Globe Champion, the Collins 32V-3 and KW-1 the Hallicrafters HT-20, Eldico's TR-1TV, Johnson's Viking II, the Sonar SRT-120, emphasized TVI suppression. B&W advertised Farady shielded links; Eimac continued to feature tetrodes; RCA listed six beam power tubes; low-pass filters were shown by Collins, Johnson, Sonar; high-pass filters by Bud and Regency; Drake and Ameco offered both types.

Amateurs of 1951-1955 could choose from a great assortment of equipment. New receivers included no fewer than three from Hammarlund, seven from National and ten from Hallicrafters. Hallicrafters' SX-88, SX-96, SX-99, SX-100, were among the ten. So was the SX-73 with its twenty-four "A Gibraltar of Stability" ads in May 1952, every one at first having the name of the famous rock spelled incorrectly, causing shame-faced last minute scurrying by *QST*'s advertising department to make the correction. In spite of several proof readings the misspelling almost got by — just like the one in this sentense.

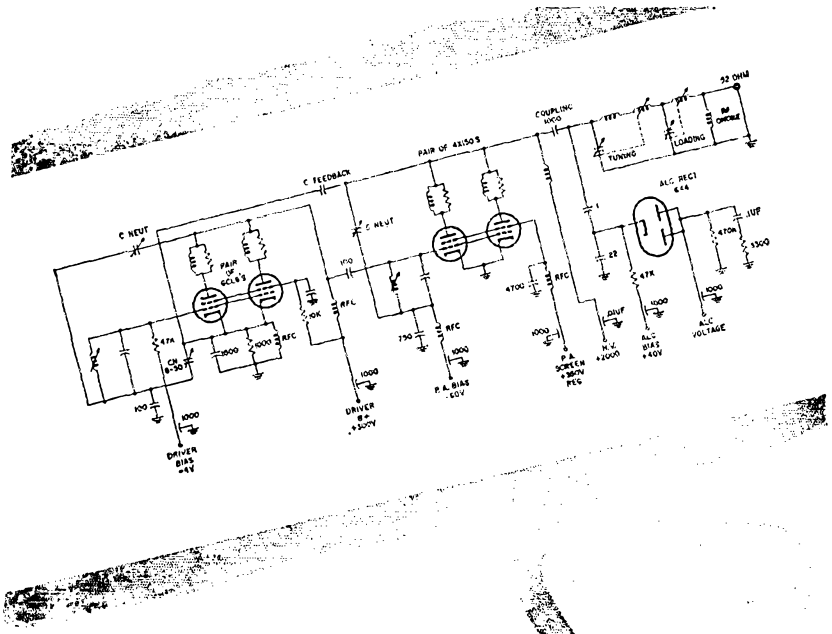
National's seven included the NC-183D, HRO-60, NC-300; Hammarlund's the HQ-140-X, the Pro-310. Collins offered the 75A-3 in 1952 and the 75A-4 in 1955. Gonset's receivers took in the Commanders, the Super Six, the G-66. Harvey-Wells introduced the R-9. Both Heath and Technical Materiel started advertising in *QST* during this period. Heath's first receiver was the AR-2 kit in 1953 and TMC's was the GPR-90 in 1955.

The selection of transmitters was as wide as the variety of receivers. In 1952 Johnson offered a new kit, the Viking II, and in 1954 kits for the Ranger and Adventurer; the Viking Kilowatt amplifier came out in 1955. The Collins 32V-3 appeared in 1951, the 32W-1 and the KWS-1 in 1955. Hallicrafters' HT-30 was announced in 1954 and was followed by the HT-31 linear in the next year. Heath's first transmitter kit ad was on the AT-1 in 1953; the DX-100 came out in 1955. WRL offered the Globe King, Champion and Scout; B&W the 5100 and 5100 B; Gonset a couple of linears; Morrow the SBR and the MB-560; Elmac the AF-67; Harvey-Wells the T-90. The Central Electronics 600L linear appeared in 1955. V.f.o. kits included the Johnson Viking, the Knights, the Heath VF-1. The Rothman system of modulation was first advertised in 1952 and Ultra Modulation in 1955.

Advertising was growing in several categories that sometimes overlapped, particularly mobile, Civil Defense, antennas. Converters, receivers, antennas and accessories for mobile use, which often included CD, were advertised by RME, Gonset, Morrow, KW Eng, S&W, Elmac, Palco, Babcock, Johnson, Columbia Products, Webster, Vaaro, Bassett, Plasticles, James Vibrapowr. Civil Defense was stressed by Hammarlund, Harvey, Harrison, Eldico, National, Johnson, Lysco, Radio Shack, Premax, Ward, G.E., Sonar, Kaar, H&K (later Robert Dollar), Electro Comm.

New antennas were brought out by Calamar and Telrex in 1952; by Gotham, Gonset, Trio, Johnson, in 1953; Buchan, Radcliff's, Trylon, Tennalab, Antenna Eng, Halliday-Moede in 1954; Universal Products, UHF Resonator, Kreco, General Crystal, Radio Specialties, Lysco, Western Gear in 1955.

Advertising on v.h.f. equipment and on beams for both v.h.f. and the lower frequencies began the growth that was to increase right up to the present time. The Gonset Communicator was the



DISTORTION FREE

at its finest *Collins* KWS-1

first 2-meter station in one package to be advertised in *QST* — July 1952. It was responsible for a surge in two-meter operation. Twenty-and fifteen-meter beams of dimensions small enough for conventional back yards enabled many amateurs to abandon the wire from house to tree. Coils for the Vest Pocket Beam were first advertised in June of 1954. In July Mosley announced the taking over of their manufacture and in September advertised the complete beam.

Four other manufacturers brought out beams of less than full size. The trade names were Bantam, Pygmy, Shortbeam, Mini-Beam. Do you remember which companies they were?

Multiband beams were shown by Halliday-Moede in 1954; by Radio Specialties, Mosley, Telrex in 1955. Tele Vue, Aermotor, Alpar started their tower advertising in 1953; Kuehne, E-Z Way, Communication Products in 1955.

Jobs in electronics seemed plentiful during the five years. More than thirty-five companies ran Personnel Wanted ads, the firms' names varying from those obviously electronic like Bell Telephone Labs and Raytheon to those sounding as if they were outside the profession like United Geophysical and American Arabian Oil Co.

Testimonial ads using ham calls were especially popular. Eimac, Collins, Sylvania, Ward, Wincharger, WRL, National, Hammarlund, Hallicrafters, Winpower, Mosley, Adams, used them — in fact, fifty-one calls were published. The fourth call area led with ten; next was the second with nine; W/K8 and W/KØ followed with six each, while the others furnished the remainder with five scattered among VE, KP4, etc., and with W/K3 having none.

Old friends developed new equipment. B&W brought out a frequency multiplier, a balun, the Matchmaster, coax switches, Johnson advertised the Match Box, the Bi Net; Harvey-Wells the Z Match; International Crystal the FO-1 printed circuit oscillator; Heath the AC-1 antenna coupler; Dow Key a selection of relays. New advertisers numbered more than sixty. Those still with us include Mosley, Heath, 1951; Adirondack, Ameco, Penta, 1952; Tecraft, Bird, Communications Co., IRE (now IEEE), Terado, 1953; Groth, 1954; Alltronics Howard, 1955.

In April of 1952 Eldico offered the Private Tutor Course, designed to teach blind persons to become amateurs. Codetrol, Dow, Go Devil were new keys. Contests were run by Hallicrafters, Raytheon, National. The Edison Award was announced by G.E. in October 1952. *QST* for December 1960 carried the last ad.

The net paid circulation of *QST* at the end of 1955 was between 87,000 and 88,000. Rate card #13, which had gone into effect with the March 1952 issue, still applied. The cost of one page of advertising was $357.50. QST

K3IOP Cleared

W3AP Retires, W3BA Promoted

Gaps In Licenses

Canadian Eleven Meter Band

TURNER RETIRES . . .

George S. Turner, W3AP, Chief of the Field Engineering Bureau of FCC, has retired, effective August 1, after 42 years of distinguished government service. OM Turner was born in Independence, Missouri, and became interested in ham radio when he was 12. During World War I he attended Navy radio schools at Harvard University and New London, Connecticut and then taught radio at the Great Lakes, Illinois, and Mare Island, California, Naval Training Stations. He later was commissioned as an Ensign in the Volunteer Naval Reserve. He has a Masters degree from the Atlanta Law School, and is a member of the Georgia Bar.

Mr. Turner was the first radio operator-engineer at 9XAB, Kansas City, an experimental broadcast station, and then worked as a student engineer for Southwestern Bell. George was ARRL Midwest Division Manager in 1923. In 1924 he became an assistant radio inspector in the Department of Commerce. He served as assistant supervisor at Chicago and as RI at Atlanta. In 1943 he became Chief of the Field Service, which has become the Field Engineering Bureau.

Since radio regulation began in 1911 under the Department of Commerce, there have been only three bosses over the agency, now known as the Field Engineering Bureau of FCC, comprising the District FCC Engineers in Charge and their assistants, and the FCC monitoring station personnel. All three pose above: from the left, Frank M. Kratokvil, W3BA, William D. Terrell, and George S. Turner, W3AP.

W3AP is a Fellow of the IEEE, is government representative on the Governing Board of the U.S. Power Squadron, and is a member of the Broadcast Pioneers and the Veteran Wireless Operators Association. He has been active in the International Radio Consultative Committee (CCIR) of the International Telecommunications Union, especially as chairman of the committee on world-wide monitoring.

. . . . KRATOKVIL BECOMES CHIEF

W3AP's successor as Chief of the Field Engineering Bureau is Frank M. Kratokvil, W3BA, who has been Assistant and later Deputy Chief of the Bureau since 1950. Older hams will remember Frank as RI at Detroit (1928-1934), Dallas (1934-1939) and Buffalo 1939-1940). During the war, OM Kratokvil was supervisor of the South Atlantic area of the Radio Intelligence Division, with headquarters at Marietta, Georgia. In 1946 he became Chief of the Monitoring Branch in FCC's Washington headquarters.

A native of Chicago, Mr. Kratokvil has a B.S. degree from Armour Institute of Technology, 1928, and the Professional Electrical Engineer degree from the same school, 1931. He became a ham in 1922 with the call 9PG. In 1927 he was one of the first hams to use f.m. Since that time, he has worn out the calls 8BA, W5FCA, W4HLT. W3BA may presently be worked on 80 and 40, and occasionally on 20 and 15, phone and c.w.

COMPUTER LEAVES GAPS IN LICENSE TERMS

No change has been made in FCC policy whereunder an amateur who has made timely filing for renewal of his license may continue to operate, even past the expiration date of his license, until he hears from the Commission. However, where the actual renewal process has been completed after expiration, the renewed license now bears the later date. The Commission explains it this way:

". . . With the adoption of Computer processing of amateur radio license applications, it is not practicable to 'back-date' a license renewal which is issued after the expiration of its predecessor, even though the application for that renewal may have been received some time prior to license expiration. As a result, numerous

amateur license renewals issued over the last six months have left 'gaps' in the renewal license terms even though timely applications were made. It should be noted that such 'gaps' do not interrupt the operating authority under licenses for which timely renewals applications were filed."

The rules now ask that renewal applications be forwarded normally between 30 and 90 days prior to expiration. Especially if an applicant is later than this in filing it may be wise for him to send his application by certified mail, return receipt requested. Amateurs should always make an entry in the log-book when the license has been sent to FCC for modification or renewal.

K3IOP RESTRICTIONS LIFTED

The Review Board of the FCC has granted the petition of Charles Seaman, K3IOP, of Elizabeth, Pennsylvania for a lifting of the restriction against operation in the six-meter band placed against Seaman's General Class license when it was issued to him in October 1963, and it has terminated the hearing procedure in the matter. In a petition filed on July 2, Seaman stated that he had disposed of all equipment in his possession capable of operation in the six-meter band, and now had equipment of commercial manufacture capable of operation only on frequencies below 30 Mc. The issue involved in the hearing was therefore moot, there was no reason for a prohibition against six-meter operation, restriction should be lifted and the hearing terminated. The League filed comments in support of K3IOP, refuting the arguments filed by the Chief, Safety and Special Radio Services Bureau in opposition to dismissal. The Review Board pointed out — in ruling against the Bureau — that only the technical fact of interference was at issue, and this has now been resolved. Accordingly, the Board terminated the docket effective August 19, 1964.

ELEVEN METERS CONTINUES IN CANADA

When the General Radio Service, corresponding to the U.S. Citizens Radio Service, was established in Canada in 1961, amateurs were permitted to keep the frequencies 26.96–27.0 Mc. A new Tourist Radio Service has been created effective July 31, 1964 under which holders of Class D Citizens Radio Service licenses issued by the FCC may be licensed to operate while visiting in Canada. Initially, there were fears that the whole band would be involved in the Tourist Radio Service, but fortunately this has been avoided after discussions between Canadian ARRL officials and the Department of Transport. Incidentally, licensees in the Tourist Radio Service will be permitted to communicate with licensees in the Canadian General Radio Service on matters of mutual interest.

The 100-m.w. walkie talkies use the frequencies 26.96–27.27 Mc. but probably will not cause any particular difficulty to VEs.

Amateurs involved in the talks with DOT included Director Eaton, Vice President Reid, Vice Director Dumbrille and Murray Epstein, VE2AUU.

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

No. 299
July 25, 1964

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Shoreham Hotel, Hartford, Connecticut, at 9:05 A.M., July 25, 1964. Present: President Herbert Hoover, Jr., in the chair; First Vice President W. M. Groves; Directors Milton E. Chaffee, Charles G. Compton, Robert W. Denniston and Noel B. Eaton; General Manager John Huntoon; Treasurer David H. Houghton; Communications Manager F. E. Handy. General Counsel Robert M. Booth, Jr., was also present.

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

Atlanta Society of Teenage Radio Operators	Atlanta, Ga.
Elder High School Radio Club	Cincinnati, Ohio
Fieldston School Radio Electronics Club (H. S.)	New York, N. Y.
Florence Amateur Radio Club	Florence, S. C.
Foothills Radio Club, Inc.	Greensburg, Pa.
Hoot Owl Club of Southwest Louisiana	Starks, La.
Limestone Amateur Radio Club	Athens, Ala.
Montgomery Blair High School Amateur Radio Club	Silver Spring, Md.
Orange County DX Century Club	Orange, Calif.
Muhlenberg Amateur Radio Society	Central City, Ky.
Poughkeepsie Amateur Radio Club	Poughkeepsie, N. Y.
The Six and Two Ham Club, Inc.	Downers Grove, Ill.
University of Kentucky Amateur Radio Club	Lexington, Ky.
West Allis Radio Amateur Club, Inc.	West Allis, Wis.

The Committee heard a report from the General Manager on developing plans to produce a new League publication dealing in general with operating matters and in particular with emergency communication.

On motion of Mr. Eaton, unanimously VOTED to approve the holding of an Oklahoma State Convention at Lake Texoma on October 31–November 1, 1964, and a New England Division Convention in Swampscott, Massachusetts, on April 24–25, 1965. The Committee noted receipt of communications from the San Antonio Radio Club expressing interest in sponsoring a national convention in 1968, and from the Federation of Eastern Massachusetts Amateur Radio Associations expressing interest in holding a national convention in 1966.

There being some difficulty with the availability of hotel facilities on the scheduled date of the 1965 Board meeting, on motion of Mr. Chaffee, unanimously VOTED that, pursuant to By-Law 20 and Article 7 of the Articles of Association, the Secretary is directed to conduct a mail vote of the Board of

(*Continued on page 178*)

The National Convention

The banquet program at the National Convention of the American Radio Relay League held in New York City August 22, 1964, was highlighted by remarks from Senator Barry Goldwater, K3UIG/K7UGA. Portions are excerpted here:

Herb (Hoover), my fellow amateurs, I wouldn't have missed this meeting for anything! The Democrats were so anxious to see me come here that they even started their convention so that we in Congress could stand in recess. Herb, it has been so long since I have made a non-political speech that I just don't know where to begin, so I may wander all over the lot but I am not going to wander for a long time.

It's a real honor to be here at the 50th anniversary of the ARRL. I was a member when the organization was nine years old. Herb told you my first call was 6BPI and then I went to school and then came the depression. And it wasn't until just a couple of years ago that I got active again. I was always interested, in fact I taught code to Chinese pilots during the War — that's hard to do! One weekend, nearly three years ago, while I was away from Washington, General Bestic and General LeMay sneaked a KWM2 into my apartment and put a vertical up on the roof and when I got back, there it was with instructions not to transmit! I got interested again, flunked my first test, took it again and passed it, so I'm very proud to be back amongst you and I don't think there will be any reason for my leaving it, tho I might have to alter a certain building in Washington. Now I hate to alter things. Some of my critics think I want to go back to some old days; in fact I think some of them believe that I operate the largest ham crystal set. It's not true — what I am really running out there are 20-meter smoke signals!

First booth seen on entrance to the hall was that of the League, here manned by Hank Koch, W2EW. Various ARRL officials were present to answer questions from visiting amateurs—only one of whom brought up the subject of incentive licensing! (RM-499 was overwhelmingly endorsed by those attending the ARRL forum.)

The 1964 ARRL National Convention, sponsored by the *Hudson Amateur Radio Council*, was held in New York City August 21–23 and according to many comments heard was one of the best ever. This shows the entrance to the exhibition hall, adjacent to the registration desk.

But coming back to this — some call it an avocation, some call it a hobby, I look upon it as a combination of those two plus a service — I don't think we should ever forget that we as amateurs owe a large part of our time to the service of other people and I have found very happily after an absence of many years that this feeling still prevails throughout ham-land. I look upon it also, and I don't think you have to find any reason to disagree with this, that it's a great expression of individualism. I challenge any group in America to match the individual in the feeling of individualism that prevades throughout amateur-land. It's an example in my opinion of men working alone, solving problems and adding to the general store of knowledge; and it's also an example of selflessness, voluntary private action in emergencies. I had this brought to me very forcefully about 15 years ago. Herman (W7TPG) called me on the phone and he said he wanted to patch me through to a doctor in the Argentine who had had an outbreak of polio in her small town and needed an iron lung. And my mother had just given an iron lung to the hospital, so he knew that I would know where to get one if one could be obtained. I talked to this doctor who spoke English, she recited what she needed, I picked up the phone, called my friend in Los Angeles who made them and he said I'll give you one if you buy another, so that sounded like a good deal. You know my name isn't Goldwater for the fun of it! A quick call to two airline presidents and the next morning those lungs were on the way and three days later they were delivered by wagon to this doctor in the Argentine and it saved many, many lives there. This is an example that was brought home to me forcefully because I had a part in it.

Also, while we come under the regulation of the Government, we are marked, I think all of us, by a degree of self-control rather than to rely on Government control; and I too want to add my commendations to the FCC. I've dealt with them from the other end of the spectrum from the political end and, being also a pilot, I'd put FCC and FAA on the top of the list of bureaus in Washington.

Herb thanked me for the Reciprocity Bill. This was not my idea; it was presented to me at a regional

Governor Rockefeller and Mayor Wagner issued proclamations in recognition of amateur radio and the convention. Here examining the city's document are (l. to r.) Co-Chairman Stan Zak, K2SJO, Publicity Chairman Gray Berry, K2SJN, Program Chairman Guy Brennert, and (seated) Co-Chairman Harry J. Dannals, W2TUK.

meeting in Phoenix a number of years ago by many, amongst them Ray Meyers, and I realized that this bill had never been successful. It had been introduced before, but we went to work on it with the help of all amateurs; I've discovered that the amateur can be a real good device when you want to get the word home to a Congress. Now we politicians can see the light very quickly, but it takes a little while to feel the heat! So we got the word out and they got told about this bill and the amateurs' interest in it. Actually my assistant, Bill Seward, did most of the work on it from the Senate standpoint, and your officers of the ARRL were the real guiding light.

Some of you may have heard of an organization that was started out in Phoenix during the Christmas Holidays past called SPARCS. The idea of this organization was to form SPARCS groups all over America in the different states and in the towns and cities where amateur radio clubs exist, having each club take on the project of putting together one complete amateur radio station, even going so far as gasoline generators and so forth. This would not be newly-purchased equipment but just the spare stuff that you and I have all over the shack floors, put together, refurbished and then made available to a foreign country where we would hope that the starting of this program would mean better communications. Now we have run into some road blocks. We had hoped that the Peace Corps might become interested in it, but they haven't shown much interest in it yet. We have had a little internal argument as to how to go about it as is easy to understand when a bunch of hams get together, and now we are thinking of going through the churches and other places, other organizations where we might get this idea started. We think it is a good one. I know that a lot of you have asked me about it on the air; a lot of you have written me about it; and we now are making our plans to get the information out about it.

The other thing that I have liked about amateur radio is the aid that they have been able to give. I think particularly of the Alaska earthquake. I happened to have been on when that earthquake started and caught the first word of it and I wasn't going to mess around and bother anybody's net. I just stayed outside and listened, but I want to compliment the net that I heard on the work they did and tell some of the others that they had better get on with procedure, but they did do a good job. Fact that this whole thing had me so excited that I have been trying to get other friends interested in it and I even have my minister interested now in ham radio. He now feels that it is better to send than to receive.

During the convention of the political party that has ended, I was kept locked up inside a room. You don't lock a fellow like me up in a room! So a friend of mine brought me a whole Collins S-line, we hung a wire out the window, and I think I made 350 contacts during the Republican Convention. The contacts of course were non-political; we merely talked about our rig and the people were very kind and I've enjoyed sending out QSL cards.

You can't imagine what a relaxation ham radio is for me. It's about the only chance I get to talk without being interrupted — and how can you mis-quote a CQ?! One of the most interesting experiences I've gone through since returning to amateur radio was an interview put on by a school in New York, arranged ahead of time: it was, I think, a half-hour interview by a political science class. I think it ran two hours! Many questions were asked, mostly non-political if you look at it that way, but we really enjoyed it.

Now, I know people ask me about what I use. I'm running a Collins S-line down in Washington. I have a Hy-gain vertical and a DB24 on the roof, which by the way points out another wonderful thing about hams; it's pretty hard for a man my age — and I don't say that disparagingly of 55 — but it is difficult for us to climb up on top of an eight-story building and then on top of an elevator shaft and then try to fix a DB24 that has shaken loose

At a pre-banquet reception in his honor, Senator Goldwater amiably complied with many requests for his autograph. Here Dorothy Strauber, K2MGE, gets the prized "Barry" memento, while Dave Popkin, WA2CCF, waits his turn.

At an informal Friday reception, W6ZH cuts the 50th anniversary "birthday" cake presented by the council to the League. Charles Kahn, K2GZ, and Mark Holstius, WB2JVB, represent the oldest and youngest groups in amateur radio—a 50-year span.

Senator Barry Goldwater, K7UGA/W3UIG, here poses for the press with ARRL President Herbert Hoover, Jr., W6ZH, showing the resolution adopted by acclamation at the convention banquet in appreciation of the Senator's many efforts on behalf of amateur radio.

in a wind. So three fellows — Uncle George and his boys — joined in with me last Sunday but George forgot to bring his walkie-talkie. So I'm down on the 5th floor, George is up on top of the roof, his boys Neil and Jim are up on top of the elevator shaft. They wanted the antenna rotated, we had no way to converse, but we always keep getting back to the old tried ways. I had a cow bell, we hung a little coax cable down three floors. I hung it in the shaft, when George wanted some action he would jiggle the cow bell, I'd stick my head out the window, he said move it 5 degrees clockwise, and we got the job done! In Arizona I run the Hallicrafter SR150 into the new Loudenboomer and into an antenna system that really puts out. We out in Arizona are fortunate in living on the desert. Most people think this is not a good ground. I think it provides the best ground that you can get outside of the swamp or the ocean, but we get tremendous distance out there.

I do have a provision in my airplane at home for the SR150 and I run a little SBE in my Chevrolet Stingray but I don't drive any more. Since I have become a candidate, I can't take care of myself. I have to have great big guys walk along. I have done all right for 55 years and all of a sudden I can't beat my way out of a paper sack. A very good friend of mine's son is taking his Advanced next week and I told him if he passed, he can have the SBE until I need it again.

We are going to campaign this year in a Boeing 727 that's coming off the line the end of next week and we have a very elaborate electronics set up in it — teletype, air-to-ground telephone, and ham radio station. So if you hear K7UGA mobile in an aircraft, I hope you'll come back.

This has been a real honor and a real pleasure, Herb, to be here tonight and meet so many of you "eyeball". I know many of us in this room have worked and I only wish I could be on the band more but I have provided some fun for myself in the coming campaign by making the bands available to me almost all the time. So while the rest of the crew sits up in the airplane and worries about what we are going to do next, I'm going to listen to hams of America and let them tell me what they think. Thanks a lot and I hope the next 50 years are doubly as productive as the first. Thank you.

HOOVER:

Barry, we are very deeply grateful to you and, if you will bear with us for a moment, I would like to ask our Convention if it will sit in formal session for the purpose of passing a motion, and I would like to read to the Convention a resolution of appreciation and with their approval I will proceed:

The Resolution of Appreciation:

WHEREAS the Honorable Barry Goldwater, Senator from Arizona, has consistently and effectively promoted the cause of amateur radio, and

WHEREAS the Senator introduced and carefully guided through both Houses of Congress a bill to permit reciprocal operating privileges to amateurs of other nations, and

WHEREAS, the Senator has further strengthened international friendship through helping to organize the Society for the Promotion of Amateur Radio Communication Services:

WHEREAS, the Senator has, suiting action to words, by operation of his amateur radio station, K3UIG and K7UGA, immeasurably increased the public image of radio amateurs,

NOW THEREFORE BE IT RESOLVED that the members of the American Radio Relay League in Convention assembled at New York City, this 22nd day of August, 1964, do heartily express to the Honorable Barry Goldwater their deep-felt appreciation for his efforts on behalf of amateur radio.

All those in favor of this motion will kindly say "Aye" (Ayes and applause)

GOLDWATER:

I would be a liar if I said I didn't appreciate this, but I would be not performing a duty to my conscience in the best way that I can if I didn't say that this should go to many other people, Bill Seward in my office, the members of the House, the chairmen of the committees in the Congress that passed it and, last but not least, the ARRL for their unlimited support. I am very highly honored and this will occupy a prominent place in my shack. Thank you. (Applause) QST

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

A FEW months ago we announced the temporary adoption of P2 precedence to take care of disaster inquiry traffic of a personal nature, in the event of an emergency before we made final disposition of this matter. We were prepared to adopt P2 permanently if we received no comment, which we fully expected to be the case.

However, we *have* received comment, and, as is usually the case, it was not favorable. So what we ought to do is let you in on counter proposals, give you a chance to comment on them or make still other proposals, then make a final decision. As usual, we'll try to abide by what the majority seems to prefer, but we cannot have a referendum on the subject; nor do we wish to stretch the discussion out interminably. Comments will be collected until the middle of October, so by December we should have our new precedence, or at least have made a decision on the matter.

We aren't going to mention *whose* ideas these are, lest the reader be unduly influenced (for or against, as the case may be) by the identity of the originator, so that the reaction can be on the idea itself. We'll present them in chronological order.

"*Operational Priority*" (OP). This would take the place of our present "priority" (P) designation and henceforth personal inquiry messages would be designated just P. In favor of this proposal, the originator says "they are so very indicative — far more so than a first and second class rating. Also the greater majority of people are former military operators and the use is therefore familiar."

"*Inquiry priority*" (IP). This would take the place of our present temporary P2 for personal inquiry traffic while our present "priority" (P) would remain as it is. Its main advantage is that it is descriptive, while at the same time it is a subdivision of the "priority" designation rather than a distinct new precedence.

"*Inquiry*" (I). A new precedence category to take care of the need for one for personal inquiry disaster traffic. It has the advantage of simplicity and descriptiveness. It would come after "priority" (P) and before "routine" (R) on the precedence list.

The fourth proposal was that we simply designate our precedences alphabetically. Our present "Emergency" would become A, "priority" would become B, "priority 2" would become C and "routine" would become D. We could call it Class A, B, C and D traffic. This proposal, of course, is to redesignate the entire list, which was not being considered; the question was what to call personal inquiry disaster traffic, or continue to call it just "priority."

The latest proposal received isn't very definite, but here it is, in quotes: "My suggestion would be to find a new word to convey the meaning of 'lower in precedence than Priority and higher in precedence than Routine.' A simple word like 'Important,' abbreviated 'I' or 'Immediate' or 'Urgent' (U) or any other word that better described the 'order of handling' could be used."

So, there you have them: all the proposals we have received so far. We cannot devote this page to this same subject every month, so it is not likely that further proposals can be outlined here, but be assured that any such will be considered along with the above. Let us know how you feel on the subject.

One of the more prominent amateurs on the west coast is W. C. Smith, K6DYX. Smitty is a PAS member-at-large, ORS, Asst. Dir., former S.C.V. SCM and PAN manager, holds CP-35 and A-1 Op certificates and is an ardent RTTY traffic man.

National Traffic System

Ever take a listen to one of the area nets of NTS? If not, you should do so; they are a real education in how to handle traffic efficiently. The ability (perhaps "agility" is a better word) of operators in snappy net-work-style traffic handling increases as you go from local to section to region to area nets, and we know of no snappier network operation anywhere than on 3670 at 0130 and 0230 GMT (EAN and CAN respectively) and on 3675 at 0430 GMT (PAN). If this operation "snows" you, you might try listening to one or more of the region nets, which are also pretty snappy, but on the average less so than area nets. The net directory will give you full information on where and when to find them.

These nets generally follow the procedures outlined in a Communications Department circular on operation of the ARRL National Traffic System, designated CD-24. However, many of the fine points of operation are left to the discretion of the net managers. One thing in particular that we would like to comment on this month is the business of getting all stations checked in. Some listening on the nets has indicated that often when the NCS gives his first call-up and stands by, a general melee results as several stations try to check in at the same time. CD-24 prescribes no order of checking-in, but some type of QNA may be of advantage to

Members of the Philadelphia, Pa. AREC held their first round-up meeting on Aug. 1. The meeting was quite successful and several new members were signed up. Standing from left to right are: *K3s* HWZ OQH WEU DLS EOD JJZ GAS NSN, a visitor from JA-land, W3ELI, K3ELS, *W3s* GPO FPC, *K3s* IHA QJS WJB ZXO FZQ. Kneeling (from l. to r.): an SWL, W3ERP, K3KTY (and his 3 harmonics), WN3APS, *K3s* PGC VBA, W3WNE and K3EEQ.

prevent initial confusion, provided it can be carried out with a minimum of delay. That's the trouble with the average "roll call." A negative response is wasted time and on NTS wasted time is anathema.

The New Jersey Net (NJN, 3965 kc., 1900 local time) has a roll call consisting of "regular" participants. The NCS doesn't waste any time with stations called who do not immediately reply; the station called had better have his hand on his key, or by the time he reaches for it he will find that the NCS has already passed him and is calling the next station. As stations are checked in, whenever two stations who can exchange traffic are in the net they are dispatched to a QNY spot to clear, without waiting for the completion of roll call. It's orderly and fast, and where there are a lot of stations to be checked in it is almost a necessity. We have heard this system in action many times and have often wondered about its application to region and area nets.

Actually, such a system is probably more suited to higher level nets than is the general free-for-all type of call-up. We set down no specific procedure; the net manager is still the boss. But we do want to advance some thoughts on the matter of using QNA at region and area level (as well as to recommend to section net managers that they might consider some adaptation of the NJN procedure).

As an example we'll use the Tenth Region Net of NTS with a real live NCS and real live QNI stations. We hope none of those concerned will sue us for using their calls as examples. Anyway, here's the way we would visualize the net procedure under a QNA system:

WØLGG (NCS): CQ TEN (repeat a few times) DE WØLGG QND QNZ QNA K (Meaning: Calling Tenth Region Net, WØLGG net control, net is directed, all stations zero beat, report in prearranged order.)

KØGSY: IE (Meaning, in effect, "Do you hear me?")

WØLGG: IE (Meaning, in effect, "I hear you, go ahead.")

KØGSY: WØLGG DE KØGSY QNI CAN QRU K. (Meaning: I am reporting in as liaison to Central Area Net, I have no traffic.)

WØLGG: KØGSY DE WØLGG R $\overline{AS}$. (Meaning: I have received your QNI, stand by.)

KØONK: IE

WØLGG: IE

Note: This may seem like unnecessary by-play, but it actually saves time, especially when conditions are not the best or when QRM is severe, to make sure the NCS is hearing the station wishing to report in before he actually does so. It will be omitted from subsequent exchanges herewith to save space.

KØONK: WØLGG DE KØONK QNI FM CAN QTC (number of messages on hand for each section in the region) K. (Meaning: I am reporting in as liaison from Central Area Net. I have the following traffic . . .)

Note: Usually, there will be only one CAN liaison station. In the early net, it will be the liaison station *to* CAN, in the late net the liaison *from* CAN. However, any number of things can prevent successful clearing of traffic, in which case both liaison stations may appear in *on* region net session.)

WØLGG: KØONK DE WØLGG R $\overline{AS}$.

WØBLH: WØLGG DE WØBLH QNI IA RX QRU. (Meaning: I am reporting into the net to *receive* Iowa traffic. I have no traffic.)

WØLGG: WØBLH DE WØLGG R $\overline{AS}$

WØBDR: WØLGG DE WØBDR QNI IA TX QTC 1 KS 2 MO 1 TRU K (Meaning: I am reporting in from Iowa to transmit traffic. I have one for Kansas, two for Missouri, one for a point out of the region.)

Note: The station to receive normally reports in first. Iowa is the first section in the region alphabetically, and is therefore the first to QNI. It is necessary for the station to designate whether he is to receive or transmit, in case one of them is late. If he does not do so, the NCS will assume he is performing a dual function and may either receive *or* transmit.

WØLGG: WØBDR DE WØLGG R KØGSY WØBDR U5 TRU K (Meaning: I have received your QNI. KØGSY and WØBDR go up five kc., KØGSY call first and receive "through" traffic from WØBDR.)

KØGSY: R (Meaning: I have received instructions.)

WØBDR: R

WØTOL: WØLGG DE WØTOL QNI KS RX QRU K (Meaning: I am reporting in to receive Kansas traffic. I have no traffic.)

Well, we don't have room for the entire net drill, but perhaps you get the idea. There are variations, of course. For example, the net control may designate what section is to report each time, but if the QNA is known to all this should not be necessary. Of course a lot depends on the agility of the stations in the net. Let's assume WØLGG completes the QNI for Kansas, both receive and transmit stations reporting in, then there is a silence because there is no Manitoba station in the net (a customary circumstance, by the way). If the next station (Minn. RX) waits for more than five seconds, knowing that Manitoba seldom reports in anyway, he is wasting time and should be prompted sharply by the net control. Let's assume there is only one QNI from Minnesota this particular session, he would QNI like this:

WAØIAW: WØLGG DE WAØIAW QNI MINN QTC 2 IA 1 NEB K (Meaning: I am reporting in from Minnesota. I have two for Iowa, one for Nebraska.")

WØLGG will know, since he did not specify either RX or TX, that this station is performing both functions. The next station in line (Missouri RX) should note this too and waste no time reporting after WAØIAW is acknowledged or dispatched to clear traffic.

After the alphabetical roster of sections has been completed, NCS opens the net to any stragglers or any other stations wishing to report in *with traffic* (stations not assigned from a section and having *no* traffic are invited to stay out).

W0LGG: CQ TEN DE W0LGG QN1 K (Meaning: Tenth Region Net from net control, stations report into net.)

Stations waiting to QN1 would then pounce, but the melee would not be nearly so severe as it would have been if net control had opened the net this way in the first place. Meanwhile, much of the traffic would have been cleared already, and it would all be to and from duly authorized TEN participants.

It always seems simple when we start giving one of these explanations, but the complications and situations that can arise are tremendous. We hope we have succeeded in getting some of the ideas across.

July reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN	31	1213	.800	39.2	99.5
CAN	31	1062	.789	34.2	100
PAN	31	1044	.768	33.7	95.7
1RN	62	375	.275	6.0	80.4
2RN	62	510	.556	8.2	98.7
3RN	62	497	.358	8.0	95.2
4RN	53	400	.279	7.5	67.1
RN5	62	739	.314	11.9	91.9
RN6	62	587	.557	9.4	99.0
RN7	31	372	.314	12.0	92.3
8RN	56	297	.240	5.3	73.5
9RN	31	427	.528	13.8	97.5
TEN	62	589	.515	9.5	63.5
ECN	31	84	.158	2.7	70.9
Sections[2]	1263	7068			
TCC Eastern[3]	92	456			
TCC Central[3]	81	996			
TCC Pacific[3]	94	1992			
Totals	1930	18,708	EAN	7.9	CAN
Record	1918	20,658	1.267	15.2	100

[1] Region Net representation based on one session or less per day. Others are based on two or more sessions per day.

[2] Session Nets reporting (44); OZK (Ark.), AENB AEND AENH AENJ AENM AENO AENP (morn) AENP (eve) AENT (Ala.), BUN (Utah), QIN (Ind.), EPA PTTN (Pa.), MDD (Md.-D.C.-Del.), NCN (early) NCN (late) THEN NCSSBN NCSN (N.C.), NTTN (Texas), Ore. State, RISPN (R.I.), SoCal 6 SCN (Calif.), SCEN SCCW (S.C.), TN (Tenn.), VTN (Vt.), Wash Sect., WIN WSBN (Wis.), MSPN MSN MJN (Minn.), OQN (Ont.-Que.), NJN NJPN NJ6&2 NJNN (N.J.), OBN (Ont.), Ohio SSB, VSN VSBN (Va.).

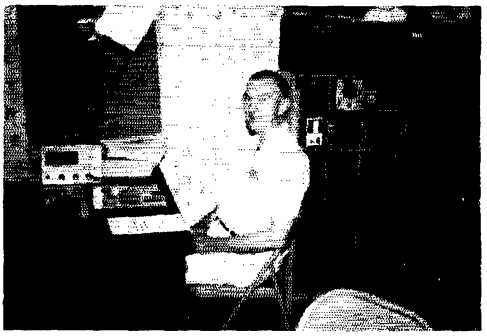
[3] TCC functions reported, not counted as net sessions.

We broke the session record this month. Could the summer lull be an indication of a big fall and winter for NTS?

Representation on 2RN has been quite good and NLI made it 100% this month. K3MVO sez that skeds on 3RN have been shifted around a bit due to summer commitments, but things are rolling along okay. W4SHJ is back from vacation and taking over the 4RN reigns again. K5IBZ sez July was the bottom of the slump with poor representation from Fla. and the loss of a good Miss. rep. WB6BBO reports that smog, heat and procrastination are plentiful on RN6 but things should get better soon. Band condx have been good for RN7 but no traffic, sez K7JHA. W9QLW reports 9RN has had its share of problems but just keeps rolling along. W0LGG sez things are looking up with some new and old blood. VE3BZB observes that not enough new fellows are getting on c.w. and ECN is having a bit of trouble with liaison. EAN is doing quite well; K1WJD sez condx have been crummy all month, with varying degrees: putrid, lousy, horrible and *what* station? When the long skip comes, July condx will seem heavenly. W9DYG reports the weather hot, but the traffic isn't. None of the NCSs has gone on vacation and he hopes they don't all go at the same time the way they did six years ago. *WB6JUH* comments that adverse condx are beginning to tell on some of the fair weather operators.

Transcontinental Corps. W3EML thanks all alternate stations for filling in for those regulars who are on vacation. A TCC certificate was earned by WA2VLK. W4ZJY sez everything running about normal considering condx; W5PPE will take over while Dave takes some time off. W7DZX reports that 40 hasn't been kind to TCC skeds but the traffic is still being passed.

June report:



Here's W4KGP, EC for Chatham, Byron and Liberty Counties, Ga. Jim was part of the hurricane disaster test held in Georgia on July 11–12 in his capacity as EC and Deputy Director of Communications for civil defense. The test was an all out effort and quite successful Georgia is set for hurricanes this fall, but let's hope none appear.

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	124	74.1	1360	456
Central	93	86.6	1519	996
Pacific	124	75.8	996	1992
Summary	341	78.3	3875	3444

The TCC roster: Eastern Area (W3EML, Director) — *W1s* BGD EMG NJM, *K1s* WJD WKK, *W2s* GVH MTA, *WA2s* BLV KQG VLK WLN, WB2ALF, *W3s* AMR EML NEM, *K3s* FKJ FHR GJD MVO, *W4s* DLA DVT, K4POA, WA4EUL, *W8s* CHT ELW, *K8s* NJW TIG, W9PTZ/2. Central Area (W4ZJY, Director) — W4ZJY, W5PPE, *W9s* AKV CXY DYG HAS JOZ QLW VAY ZYK, K9DHN, WA9AUM, W0BDR, K0FPC.

—•••—

Net reports:

Net	*Check-ins*	*Traffic*
7290	1005	491
Hit and Bounce	397	366
Interstate SSB	706	168
Northeast Area Barnyard	1058	9
North American SSB	516	356

Diary of the AREC

We're still receiving reports on the Alaskan 'quake. KL7CWO helped to get station KFQD back on the air, using emergency power. The station was used to broadcast messages received via amateur radio to those persons who couldn't be located by any other means. Two and 75-meter emergency stations were set up in the announcer's booth and any emergency messages received were put on the air immediately.

KL7CNW was instrumental in establishing contact between the electric company in his town and key officials in the "lower 48" so they could discuss the best means of restoring power.

Other stations reported to have participated in the emergency were: *KL7s* AD AKD AUV BKB BLL CFN CLH COX CQS CTP DEJ EN ECO ERW BIO DTH BNL, K1GRC, K7SFN.

—•••—

On June 8, the northwestern part of Montana was hit with 8 inches of rain. This rain, along with the melting snow in the mountains, created a dangerous flood condition. By 11 A.M. the Swift Dam had broken, flooding several towns near and including Great Falls. W7KUH, Montana SCM, set up a portable station at the Great Falls International Airport. The emergency standby power plant was put into readiness and all amateurs that could be contacted were alerted and advised to standby for emergency communications. W7SFK organized the RACES network, which worked directly into the state capital at Helena. W7OCD, West Glacier, K7TBC, East Glacier and K7IZI, Choteau operated portable stations out of these locations, which were completely isolated, without power, telephone

(Continued on page 160)

ANNOUNCING 1964 ARRL SIMULATED EMERGENCY TEST

October 3–4, 1964

It's that time of year again. Just as every June we amateurs succumb to a form of madness known as "Field Day," every October we gather our emergency gear and gird our emergency organizations to a test of our public service facilities in the annual Simulated Emergency Test, known throughout the fraternity as the SET. Like most activities, this gets bigger each year, and with current emphasis on public service we expect it this year to be bigger than ever.

But the SET is not a contest. It is a serious effort on the part of amateurs nationwide to (1) find out just how good we are or would be if an emergency occurred, and (2) put on a public demonstration to *show* how good we are.

The SET consists of two different parts, connected but quite distinct. One is the local AREC exercise in which the ARRL emergency coordinator puts his AREC group through its paces, usually on a surprise basis. These exercises may be held any time during the week end, or may be held on any date within a month either side of the weed end, if this is desired, and still count as the official SET. The other is the long haul aspect of traffic handling in which the principal facility is the ARRL National Traffic System. These two divisions, the AREC and NTS, together comprise the Amateur Radio Public Service Corps.

Here's the way the SET works:

1) The local EC notifies his AREC group that a Simulated Emergency Test, in connection with the nationwide exercise, will be held, and gives full details. He can do this either in person or by mail, but preferably the former if a meeting can be arranged. Most ECs prefer to have an element of surprise in their SETs, to further the aspect of reality. At the meeting should be all assistant ECs and representatives of to-be-served agencies, such as the Red Cross and civil defense. In some areas, the drill may have a strong RACES flavor, or be devoted entirely to RACES — but the SET is an AREC exercise.

2) One or more members of the AREC group are designated to conduct liaison with a section NTS net, so that traffic going to and coming from the "outside" will receive prompt handling through ARPSC channels.

3) The EC originates a message to ARRL headquarters briefing (in 25 words or less) the simulated situation. These messages receive a "TEST P" precedence.

4) Messages are solicited from local Red Cross and c.d. officials to their national headquarters or regional offices, to be handled entirely by amateur facilities. These messages also receive "TEST P" precedence.

5) It is customary for each AREC member to originate a message to his Section Emergency Coordinator, to be handled through regular ARPSC facilities; this keeps the NTS nets at section level busy.

6) Speaking of the SEC, he may have arranged a section-wide exercise, or even a multi-section exercise in conjunction with several other SECs, simulating a widespread emergency situation instead of the usual local one.

7) Nets of the National Traffic System, division of ARPSC, will be active, most of them in extra sessions, to handle the load of long haul traffic. Managers of these nets and all AREC officials will have received detailed instructions by the time you read this (we hope).

8) Watch out! We just may have some more "test emergency" traffic floating about again. Such traffic will be thoroughly traced. Better bone up on how to handle "emergency" precedence traffic.

9) The National Calling and Emergency Frequencies will be monitored by volunteer stations (see box insert), but your best bet for clearing traffic is to report into your section NTS net (see net directory).

All amateurs not taking part in the SET are urged and requested to cooperate by clearing frequencies being used for this purpose. This is not "another contest." This is a drill aimed at public service in the name of amateur radio, something that will be of benefit to everybody. If this cramps your style, why not get in on it yourself? See your EC. What, you have none? Then isn't it about time you got one appointed?

Hope to see you all in the Simulated Emergency Test, Oct. 3-4 — *W1NJM*.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *phone* — 3765, 14,160,028,250 kc.

Section Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does *your* town have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION				
Delaware				
Eastern Pennsylvania	W3ELI	G. J. Van Dyke, Jr.	4607 Convent Ave.	Philadelphia 14
Maryland-D.C.	W3CVE	Conan W. B. Barger	7512 Foster St., SE	District Heights 20028
Southern New Jersey	K2ARY	Norris J. Mundell	S. Johnson St.	Carneys Point
Western New York	W2ICZ	Sydney F. Chiswell	76 Chardon Drive	Buffalo 25
Western Pennsylvania	W3LIV	William T. Tobin	4916 Fifth Ave.	Altoona
CENTRAL DIVISION				
Illinois	W9RYU	Harry Studer, Jr.	705 Hillcrest Rd.	Milan
Indiana	K9WET	Ralph L. Piercy	RFD 1	Walton 46994
Wisconsin	W9BCC	Frank L. Guth	428 Ellis St.	Stevens Point
DAKOTA DIVISION				
Minnesota	KØKKQ	L. A. Pearthree	800 5th Avenue, W.	Pine City
North Dakota	WØCAQ	Douglas Classon	445 Elmwood Avenue	Fargo 58101
South Dakota	WØSCT	Lester R. Lauritzen	R. 3, Box 32	Centerville
DELTA DIVISION				
Arkansas	W5NPM	Samuel M. Meeks	1917 B 5th St.	Blytheville AFB 72317
Louisiana				
Mississippi	W5JDF	Charles R. Boone	707 High Extension St.	Aberdeen
Tennessee	W4RRV	Sanford B. DeHart	227 S. Purdue Avenue	Oak Ridge
GREAT LAKES DIVISION				
Kentucky	K4URX	Stephen McCallum	2910 Eastern Parkway	Owensboro
Michigan	K8GOU	Donald R. Van Sickle	20295 Westpoint Court	Southfield 48076
Ohio	W8HNP	Arlington A. Garn	5034 Oak Ridge Drive	Toledo 43623
HUDSON DIVISION				
Eastern New York	W2KGC	William L. Stahl	Shirley Avenue	Fishkill
N.Y.C. & Long Island	K2OVN	John S. Brandau	1659 E. 46th St.	Brooklyn 34
Northern New Jersey	K2ZFI	John W. Banke	P.O. Box 177, Main Rd.	Towaco 07082
MIDWEST DIVISION				
Iowa	KØVBM	Albert H. Haentler		Washta
Kansas	KØBXF	Robert M. Summers	1125 N. 50th Place	Kansas City 66102
Missouri	WØBUL	Charles O. Gosch	711 South Oakland	Webb City
Nebraska	KØJXN	Larry Abbott	Abbott Ranch	Almeria
NEW ENGLAND DIVISION				
Connecticut	W1EKJ	Vernal G. Charles	216 Clement Road	East Hartford 8
Eastern Massachusetts	W1AOG	Donald F. Guptill	17 Park St. Court	Medford 55
Maine	K1DYG	Herbert A. Davis	Lakes Lane	Ellsworth Falls
New Hampshire	W1TNO/ W1ALE	Edward F. Everett	77 North Main Street	Concord
Rhode Island	W1YNE	Gordon F. Fox	151 Whipple Road	Esmond 17
Vermont	K1DQB	Gerald E. Wood	R.F.D.	Ferrisburgh
Western Massachusetts	W1BYH/ K1APR	Norman L. Rivers	302 Pleasant St.	Lunenburg
NORTHWESTERN DIVISION				
Alaska				
Idaho				
Montana	W7KUH	Walter R. Marten	3021 6th Avenue, S.	Great Falls
Oregon	W7WKP	Jesse E. Parrish	P.O. Box 11	Sweet Home
Washington	W7HMQ	Everett E. Young	2217 5th Southeast	Puyallup
PACIFIC DIVISION				
East Bay	WA6OLF	Jack Palmatier	4153 Porter Street	Oakland 96795
Hawaii	KH6CCL	Ernest J. Kurlansky	41-955 Laumilo St.	Waimanalo, Oahu
Nevada	W7JU	Ray T. Warner	539 Birch Street	Boulder City 89005
Sacramento Valley	WA6HYU	Mary Ann Eastman	2830 Santa Paula Ct.	Sacramento
San Francisco	W6KZF	Bill Ray	52 Matilda Avenue	Mill Valley
San Joaquin Valley				
Santa Clara Valley	WA6HVN	Harold L. Whitfield	3148 Jenkins Street	San Jose 24
ROANOKE DIVISION				
North Carolina	W4MFK	James W. Botsford	P.O. Box 452	Hillsboro
South Carolina	K4HJK	William L. McDermott	650 Lakeside Dr.	Rock Hill
Virginia	W4SHJ	Harry J. Hopkins, Jr.	8600 Hammett Avenue	Norfolk 23503
West Virginia	W8SSA	E. K. Chambers	P.O. Box 62	Bluefield
ROCKY MOUNTAIN DIVISION				
Colorado	WØSIN	Charles M. Cotterell	430 S. Swadley	Denver 26
New Mexico	K5QIN	Robert E. Cowan	1466B 45th Street	Los Alamos
Utah	W7WKF	McCarroll Petersen	1180 E. Whitlock Avenue	Salt Lake City 84106
Wyoming	W7YWE	Frederick L. Hildebrand	P.O. Box 143	Douglas
SOUTHEASTERN DIVISION				
Alabama	W4NML	William C. Gann	2115 Brookline Drive	Huntsville
Canal Zone	KZ5OC	Eugene D. Rossel	Box 917, Howard AFB	Canal Zone
Eastern Florida	W4IYT	Andrew C. Clark	41 Lenape Drive	Miami Springs 33166
Georgia	K4MDC	James Gary Chambers	3112 Dove Way	Decatur 30033
West Indies (P.R.-V.I.)				
Western Florida	W4MLE	George L. Thurston	2116 Gibbs Drive	Tallahassee
SOUTHWESTERN DIVISION				
Arizona	K7NIY	George Mezey	P.O. Box 73	Sun City
Los Angeles	K6YCX	Frank P. Merritt, Jr.	2041 South Benson	Ontario
San Diego	W6SK	J. Don Campbell	3235 Idlewild Way	San Diego 92117
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court	Thousand Oaks
WEST GULF DIVISION				
Northern Texas	K5AEX	Robert G. Bender	C/ OCDM Civil Defense	Denton
Oklahoma	K5DLP	William Pierce	901 Bell Avenue	Lawton
Southern Texas	W5AIR	G. D. Sears	5634 Eskridge	Houston 77023
CANADIAN DIVISION				
Alberta	VE6FK	Don Sutherland	444-25th Avenue, NE	Calgary
British Columbia	VE7OM	W. C. Orchard	13733 62 Avenue RR 15,	North Surrey
Manitoba	VE4OL	John H. Bell, Jr.	453 Rita St.	Winnipeg 12
Maritime				
Ontario	VE3AML	Rowland Beardow	1899 Lake Shore Road	Sarnia
Quebec	VE2AUU	Murray E. Epstein	4368 8th Street	Chomedey
Saskatchewan	VE5CU	W. H. Parker	1008 10th St., East	Saskatoon

Some Fine Points in Message Handling

Part 1: A Detailed Step-By-Step Analysis of Handling A Message

BY GEORGE HART,* W1NJM

When you combine experience with horse sense, you come up with a lot of little quirks that can make traffic handling both more fun and a better service. This article aims to acquaint you with a few of them.

LISTENING to some of the traffic handling on the air these days, one would think there are almost as many different ways of handling it as there are traffic men. We don't intend, here, to deal in the basics of message handling. This has been done before,[1] and information on it is available in free ARRL literature.[2] What we want to do here is give a rundown of some of the fine points of handling traffic, both by c.w. and voice — some points that are not mentioned in current literature because (1) there is no room for them, and (2) they are too picayune. Non-observance of any one of them will make little if any difference; but observance of *all* of them will make our traffic operation a little snappier, a little more accurate, and *a great deal more enjoyable* for all of us.

Now you non-traffic men need not turn the page and look for a good technical article or something "interesting." These things will make sense to you too, even if you don't know all the basics of traffic handling — because they are based on common logic, and that's something we all have(?).

The Basic Fault

Before we go any further, we should make one mention of the basic fault in all traffic handling about which we (that is, we at headquarters) can do nothing: *carelessness*. No matter how rigid and closely followed the rules, if we are careless, if we acknowledge receipt without being sure, if we leave out parts, if we arbitrarily change things to what we think they *ought* to be, if we assume without having actually copied, we are going to have garbled traffic and all the rules and hints and kinks in the world aren't going to correct it. So let's dispose of this factor by saying "Don't be careless," and let it go at that.

RTTY

While we are disposing of things, suppose we mention here (before someone else does) that RTTY is an ideal way to handle record traffic, but we don't intend here to discuss RTTY procedure because (1) none has yet been formulated for amateur traffic work, and (2) most RTTY'ers are gadgeteers, not traffic men. The mode is becoming more widespread as more equipment becomes available, and before long more traffic men are going to be installing RTTY gear. When its use for handling traffic seems to be on the increase, we will consider any special procedures required. As of the present time, 99% of all traffic is handled on either c.w. or phone.

The Preamble

C.w. operators start the message with NR. This is necessary because it, in effect, says to the receiving operator "Okay, boy, here it comes!" Otherwise, a numeral would be thrown at him "cold" and he might not come alive until you are half way through the preamble. On phone, one just says "number." Some phone operators like to be fancy and say "please copy message number," or "follows message number . . ." This is all right, if a little on the gabby side. On c.w. it takes longer to be gabby and wastes time. Repeat the number, because it's very important that this be right. On phone, pronounce each digit distinctly. Don't say "nummer fi'hunnert niney t'ree," say "number fiyev niyen thuree."

The precedence (every message should have one) can be abbreviated to a single letter on c.w. if it be R or P, but must be spelled out if it be EMERGENCY. On phone there is no need to abbreviate. If the message has no precedence when you get it, put an R on it when you relay.

If the message contains handling instructions (HX), just transmit it cold on c.w. (e.g., HXC). On phone, no need to phoneticize [3] the HX, but *do* phoneticize the significant letter.

Send the station of origin twice, on either phone or c.w., both because it's important and because it's easy to garble. On phone, use pho-

* National Emergency Coordinator, ARRL.

[1] Hart, "How to Handle A Message," *QST*, Nov., 1957, p. 48.

[2] Ask for a free copy of the booklet *Operating an Amateur Radio Station*.

[3] A coined word. Like it?

netics the second time. *Which* phonetics? Gad, let's not get into that! The purpose of phonetics is to make yourself understood, not to show your loyalty to the military, Western Union, ARRL, or your own cleverness and sense of humor.

On phone, it's no trouble to say "check" before the word count, but on c.w. the prosign CK is just as well omitted. The check is *not* optional, so don't say "CK XX" or "check double X-ray." If the message comes to you without a check, or if it has an incorrect one, count the words in the text and relay it along with a corrected check. Then, on c.w., you'll have something like NC/10, and on phone "no check, corrected to ten." Whatever you do, *make sure* your copy agrees with that of the sending operator before you receipt for the message — because once you have receipted for it, any discrepancies are your responsibility.

The place of origin is the city and state (or province in Canada, or country elsewhere), *nothing else*. No free advertising for fairs, expositions, nets or systems: just city and state. If the place of origin is a foreign country not permitted to handle traffic with U.S. or Canada, then a "via" can indicate how the message reached the station of origin (e.g., via MARS, via RCA, via mail, etc.).

In case you missed it in the ARPSC column last month,[4] we have dropped the procedure of using "via" to indicate a place of origin different from the location of the station of origin. Now the place of origin is the place the message originated, and the station of origin's location has nothing to do with it.

Don't get in the habit of omitting the name of the state or province from the place of origin. We get messages having "NYC" or "MTL" or "SF" or other similar gibberish as the place of origin. This is just plain sloppy traffic work. *Spell out* the city (yes, even Philadelphia) and include the state (yes, even for New York City). Don't say "same" and let the other guy figure out what it's the same as. Every message that deserves to be handled deserves to be handled separately. Leave us not be slovenly. Leave us handle a tidy, precise message each time.

If the message contains a filing time, pass it along exactly as received. Exception: amateur procedure has not (yet) adopted date-time groups, so these can be broken down into separate time and date. Otherwise, relay the filing time as received, whether it be in GMT, DST, standard, A.M.-P.M. or whatever. C.w. transmission of the month of the date can be omitted (we *hope* no message will be so old as to cause confusion) if desired. On phone this is unnecessary. Some phone stations just say "today's date" or, for example, "eight thirteen sixty-four" instead of August 13. Why they do this we'll never know, but it's mighty "liddy" phone procedure. In the case of the former, the receiving operator has to stop and think what the date actually is (and often in haste gets it wrong). In the case of the latter, this might not even be recognizable as a date, not to mention the inanity of including the *year* as well as the month.

[4] Sept. *QST*, p. 52.

The Address

Quite a struggle, getting through that preamble; and still, there are undoubtedly some small points we have omitted. Nevertheless, let's get on with the address, there is still a lot of ground to cover.

An address usually consists of a name, street and number, city and state; but there are a lot of variables. The name might include a title before or after, or more than one name, or this part of the address might include call letters. The address might not be a street and number at all, but a route or box number; and in addition to the city and state there might be a telephone number. A company name could also be included in the address. And some of these military addresses (e.g., A/1C William Smith, RA 957642, HQ & HQ CO ENGRS, 15TH SVC BN PDQ HMS EGAD, FT MORBID CZ) are just plain murder! You hope the sending station has it correct, because it sure doesn't make any sense to you!

With so many variables, how does one send the thing so a receiving operator can make accurate copy? Well, it "ain't easy." On c.w., it is best to leave out the prosign "TO." The "to" always follows the date, so this is unnecessary and could be misconstrued as part of a first name. For example, suppose the name of the addressee is "TONY FAIR"; the receiving operator might very easily try to deliver the message to the New York Fair. On phone similarly it is unnecessary to utter such phrases as "going to," although the likelihood of confusion is less probable here.

The address of the message is one of its most important parts and one of the most difficult — hence, it is where a great many garbles occur. It should be transmitted, by whatever mode, with the greatest of care. By voice, speak each syllable distinctly, spelling out phonetically all difficult words or initials. Avoid such inanities as "common spelling," and "Missus, a married lady," and avoid over-phoneticizing. Usually,

(*Continued on page 178*)

if you speak quite distinctly (surprising, how few people do), it is not necessary to use phonetics except in very extraordinary combinations.

On c.w., be sure to use the AA separation sign between parts of the address; you can really mess up a perfectly plausible address if you omit it (e.g., 159 MAIN ST WEST OVERSHOE LA — is the "west" part of the street or the town?). If the address doesn't sound right to you, never mind what you think it *should* be. Just be sure you have it right the way the other guy sent it to you. If he is the originator, you might wish to get him to correct it, but if he is just relaying it, get in touch with the originator *after* you have receipted for the message.

We traffic men don't like being told how to route our traffic, and besides it's an unnecessary restriction. Avoid special instructions in addresses, such as "via Podunk Net." Even if such instructions exist, relayers will (and should) use the best and quickest means to get the message to the addressee.

Telephone numbers are useful in a message address, but worse than useless if not transmitted or received correctly. Even if the address is wrong but the telephone number is correct, you can still deliver — so take extra care in copying at this point.

The Text

This is what the message is all about. Messages are originated because someone wants to say something to someone else; therefore, what they want to say is the crucial part of the message. Remember, as long as the originator knows what he wants to say, *you* don't have to. You don't even have to understand it. This is the business of the originating person and the addressee. All you have to do is relay the text to the next station in line or deliver it to the addressee, exactly as you received it.

Now we're not saying you can't be nosey or curious or critical or any of the other attributes of the average human being. You can laugh, ridicule, snort, be embarrassed, outraged or shocked, to your heart's content, as long as you relay or deliver the message *exactly as you received it*, including poor grammar, rotten diction, misspellings and regardless of whether you disagree with the content or think it utter tripe. Have fun, but don't let this diminish the public service rendered.

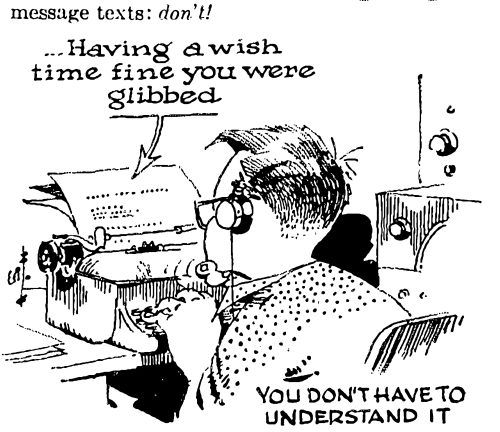
Before starting to send the text, insert a BT sign on c.w. On phone we hear "break and the text," but this doesn't seem necessary; just a pause ought to be enough.

Amateur procedure has always been to spell out all punctuation when it is necessary to use same, but to avoid it as much as possible. Should you receive a message in which punctuation is included, it is proper to *spell it out* when you forward the message. It is common practice to use STOP or X in place of periods or semicolons, QUERY in place of question marks. Most amateur messages contain only STOP or X in lieu of punctuation; very rarely does one run across anything else.

Numbers appearing in the text should be sent *as they were received* — that is, if they were received as numerals, they should be relayed as numerals. If they were received spelled out, they should be relayed this way. How do you indicate which is which on phone? A good question. We think the best way is to spell it out if it should be spelled out, just say the numbers otherwise. For example, suppose the number 985 appears in the text. If it appears in numeral form, as above, just say "nine eight five." If it is spelled out, say "Nine, I spell N-I-N-E, eight, I spell E-I-G-H-T," etc. Okay? Don't forget, if it is spelled out it "checks" differently than if a numeral, and this can be a tip-off.

On c.w., if you come across an address in the *text* of a message, *do not* use the separator sign AA between its parts. Separation in this case is the sender's and addressee's problem; *you* don't have to understand it.

A good rule to follow in making changes in message texts: *don't!*



The Signature

One separates the text from the signature with another BT on c.w., just a pause on phone. It is helpful to say "signature" or "signed" on phone, but *DO NOT* say "SIG" on c.w. Why not? Well, here's a few examples of what happens

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

"This month brings glad tidings," a W1's well-circulated announcement goes. "Plans are under way for the most sensational expedition of all time and, with the proper support from you, it is bound to succeed. For a long time the DX contingent has been moaning because certain countries had no amateur stations in them and it was, therefore, impossible to add them to their 'worked' list. However, under the present plan, stations will be set up in the rarer countries and, at the end of a five-year program, *all* countries will have been heard from.

"The plan consists of first selecting typical operators from each of the nine districts, operators who will be selected because they exemplify everything that is correct and proper in operating. These operators will be elected by popular vote, and it will be illegal for any one man to vote for himself more than once. He will be equipped with a complete station, kw. transmitter and s.s. super, and given an itinerary which he must follow closely.

"All expenses will be paid from a fund established by the amateurs staying at home. The price will be $1.00 per country, so if you contribute $10.00 you are entitled to contacts with ten different countries. No contacts will be made with stations who have not contributed to the cause, and, to avoid confusion, those who have paid their money will sign 'PU' after their calls signifying that they are 'paid up'. Those who have not contributed are not supposed to call these rare DX stations."

* * *

Well, you can't brake the wheels of progress. Nuclear fishin', automation, pills for all ills, and topless swimsuits for the ladies. Good? Bad? That's beside the point because the new-new-*new* lies far beyond mere qualitative consideration. A glorious end in itself, so-called progress is to be embraced for its own magical essence, and DX Century Club progress — more "new ones" for more DXers more quickly and conveniently — can hardly be denied.

Trouble with some of these newfangled angles is that they're merely *ancient* rejected brainstorms warmed over and disguised in modernistic trappings. The fine line that separates the truly progressive from the preposterous is still discernible though it may become obscured. W1DX, then conductor of "How's DX?" as W1JPE, broached the preceding proposition as a gag almost thirty years ago. Those are By's very words from a 1937 *QST* (April issue, of course). The recommended suffix is still PU.

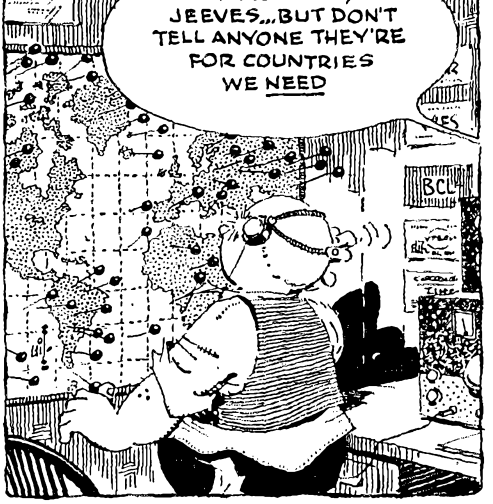
*7862-B West Lawrence Ave., Chicago, Ill. 60656

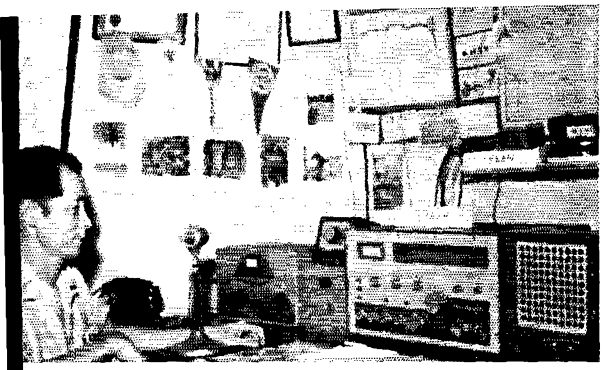
What:

DX optimists continue to score heavily against the propagational pessimists in our ranks. Jeeves & Co., fair middle-of-the-roaders in their debate, must admit that things are going along in surprisingly good style on the DX front. Previously we had been almost convinced that 21 Mc. would be pretty well washed up by the end of '64. After all, fifteen developed practically no DX steam at all during the last sunspot minimum. But here we are, just about out of sunspots again, and Novices are showing up with brand-new WACs and half-DXCCs under their belts! Let's go for a spin in the "How's" Bandwagon for further cheery evidence. . . .

15 phone, to show you what we mean, enables **K7VMO, WAs** 2KSD 2WIJ 4JJY 5CIY 5EID 5GZX 6TGH 6TMY 9FZQ and listener C. Maher to deal with **CEs** 2AW 2BH 2BJ 3CT* 3CZ* 3TV 3XA* (21, *391 kc.*), 3YU 5EQ, **CN8BU, CO2XA, CRs** 4AD 6AL 6DB 6DU 6DX* 6GO (120) *1900 GMT*, 6GS 6GV 6JL 6JT (250) 19, 7BM, **CT1s** CN JH JR SX, **CXs** 1AE 5AAM 0, 9CO, **EAs** 1EY 2FC (305) 21, 6AM 6AR 8CL 9AY, **ELs** 5D 6E* 8ND* (411) 19-20, 8X, **F2HQ, FG7XL, HCs** 1AF* 1AH 20, 1AO* 2LI 7BG ØEG* (400) 23, **HI8s** EFO NBG NHA NRB SCE XCD, **HKs** 1XT* 2GO (285) 22, 4PJ, **HPs** 1AP 1LB 3MP, **HRs** 1DFO 1EU 2JH 4DHS, **IS1**BCO, JA3API/mm, **KP4s** BMJ BQP, **KV4**CX, **KZ5s** AX* BY EZ JK KE KL MC RZ TJ*, LA9II/mm, **LUs** 1AB 1LC 7CA 8BU*, **OA4s** AO BH EM PJ* QH*, **OD5**AX, **OE2**BSL, **PYs** 2CDY 3HF 7AKW 7EC 8AW* 8OL (280) 20, **SP6**ABH, **SV1**AN, **TG9s** BM/m GB MP* UP, **TI2s** AB EGU NAG PCF*, **TJ8s** AG YL, **TL8**AC, **TN8**AD, **TR8**AD, **TT8**AL, **UA6**NY, **VKs** 2ADE 3MO 3VL 4ZB 6LU 6QL, **VPs** 1DJ 1WS 0, 2AQ 2GAZ 2KD 2KG 22, 2SI 5BB 23-0, 6JC 6ZX 7DD 7NS 8DM 9BY*, **VU2**NR, **XEs** 1NL 1SSO 1TP 1VZ 1WB 2ZT 3EB 3PY* 3VL ØSW/m, **YNs** 1MAN* 1RK (370) 0, 3FV 20, 4CF* 4JG 3, **YVs** 1II 19, 4AJ* 4IQ 4JG 3, **ZD3**A, **ZE2**KL, **ZLs** 1AO 1CA 3JO* 4LB, **ZP5s** CF* DL, **ZSs** 1AB 1BV 6DK* 6BIN 7R, **4X4**MJ, 5A1TK, **5B4s** AK JF JR MO, **5H3s** JI JJ JL JW, **5N2s** EGL JKO* RFB, **5X5**JK 18, **6W8s** AE CZ, **6Y5s** AH LT, **7X2**SQ, **9G1s** EC DI DM (230) 19, **9K2**AX, **9L1**WN, **9M2**EZ, **9Q5s** AA CB CO FC FD FL OO PP SL TH, **9U5s** BB DL 19 and **9X5**LR. The asterisks stand for single-sidebanders who *remain in surprising minority among* 21-Mc. phones.

15 c.w. does well by **Ws** 1ASZ 1DYE 2BTQ/KH6, K3UXY, **WAs** 2WIJ 4SHD 5AER 5CIY 6TGH 6TMY and **WB2**JQC who weigh in with **CRs** 6AI 6EQ 6JA 6JJ 6JL (50) 19, 7IZ 7LU, **DU1**VM (28) 7, **EL8**X





6YAAH, now 6Y5AH, posted the leading Jamaica phone score in this year's ARRL DX Contest. Alec prefers 21 Mc. when the bounce is decent, and also handles the 6Y5 QSL bureau. *(Photo via W1YYM)*

ET3JF, HC2SB (90) 22, IT1AI, JAs 1DNL 1HKP 1HUY 1KHI 1LPZ 1LYK 1NLX 1NOX 3EGE EOP 3EQC 3JM 4CNS 5AVI 5SY 6ADZ 6BXA 6DH 6TQ 8AJM 8OW 0ACO 0AZJ mostly active at 6-10, KP4s ANJ ATS, LU1DQB, OAs 4AO (80) 22, 6JL, PYs 1MCC (91) 22, 2DEH 3AZ 5XQ, SM7BLJ/mm, VKs 2APK 5PC, VPs 5NK 9BY, VQ2BC, VS8s EK EY, YVs 5BVQ (89) 1, 6CP, ZE1BO, ZP8IS, ZS1ACD, 4X4s NTB NYP WF, 5B4AK, 5N2JKO (25) 16, 5X5IU, 5Z4IV, 7Q7RM (85) 19, 7X2DU (18) 21-22, 9L1TL, 9Q5TJ and 9X5MW . . . . . 15 **Novice** endeavors, led by WNs 4PXP 4RLJ and 0JDF, track down trophies like EI9S (105) 19, HK1BQ (105) 18-20, KZ5s KY TG (105) 21, PJ2MI (130) 23, PYs 1CBW 1NDA 22, 8MG (105) 17, VP2MV (35), WP4s BOR BQW, XE1NL, YVs 1JJ (116) 22, 5ATX and 5BRI. The tyro topic is further discussed in "Whence".

10 **phone** is well used overseas, so let's have no complaints of scant activity at the DX end. If and when breakthroughs occur you'll find signals from CN8TY*, GT1s AQ DJ FI, FU IP MS ND TX, EAs 3NS 3GJ 5AZ, Fs 3FQ 8FZ 8RZ, plenty of Gs, GI3JIM*, GMs 3GQH 3LQH 3SKX of the Shetlands, 8SQ, HA1KSA, HB9s ABX ACC ACZ, HC2LI, HI7ZG, HR3DW, IIs ABN AHO, IT1AZW, a dozen or more DJ/DL/DMs, LAs 1II* 1MB 2YF 4VG, LUs 1 DM 18, 1DXT 20-21, 4DM 18, OEs 1BEW 1PC 5NO 6UL, OK1VK, ON1HR, OY7ML*, OZs 1NA 6OL, PJ3AN*, PX1AI, SLs 5AB 6PH, SMs 4BE 5BL*, SP8s AJK CK, UAs 1KBN 2KBD 2KBF 3ACW 3UPW 3ZO, UB5s CMZ EDF LV, UC2s AVV OS, UP2s ACA KAC NBU, UR2GT, UT5s BV DU, VP2KJ*, VQ2DT, YO7EA, YUs 1AA 3OV, 4X4DK*, 5As 1TT 4TI*, 5B4 AK, 5X5JK, 7X2SQ, 9G1s DM and EC, straight-a.m. lads heavily outgunning the s.s.b. (*) stalwarts on this band . . . . . Ten c.w. gets a good play in the Continent when sporadic *E* skip sets in. Participants include CR6AI, DL7s AA DII, Gs 20C 4WK 5XD, GI3IVJ, HER, OK2BBI, SM7CMZ, UC2AUC, VQ2WR 14, VS9AMS, ZD3A, 5N2JKO, 5Z4IV, 7Q7RM 13 and 9L1NH. As for trans-oceanic openings to W/Ks, things don't look promising. This is the time of year when they're most likely to occur, however, so keep us posted.

40 c.w., second only to 14 Mc. in the production of juicy QSLs these days, finds Ws 1 ECH 7DJU, Ks 4IEX 4MYO 5JVF, WAs 2FUL 2KSD 5OYX 5EID 8ECH, WBs 2ALF 2JYK and 6DFQ tangling with one AC3AM (3) 3, BYs 2IL 4TC/AC5 20, CEs 2DI 4, (5) 6, CMs 2EJ (80) 9-10, 5FS (1) 14, 5GG, CO2JQ, CP5s AQ (5) 23, 5EZ (15) 0, CR6AI, CX1RY (13) 3, DL2DF, DMs 2BPO 3SB (12) 2, 4ZJJ, EA7JZ (12) 7, EI5AJ, EL8NA (30) 7-8, EP2s BQ RC 23, F7BC, FB8YY (11) 7, FY7YK (9) 9, GCs 2FMV (4) 5, 3IIPE 9, GIs 5UR 6TK, HAs 3GF 4YM7 LM7PR, HB9QT, HI8NPL, HKs 3RQ 4DP 4DT, HM1JN, HR2FG (9) 9, IS1-KA, IT1AGA, JAs 1AAP 1CSB 1EQM 1JDF 1JEE 1JWM 1KFU 1KGT 1KJY 1OHV 2BVS (6) 11, 2EA 3CZH 3GHN 3GKO 4YBU 5AJQ 6AKW 8BKI 8BNH 8YZ 0BBB 0BCO (15) 10, KCAs USB (15) 5, USK (4) 5, USN 12-13, KL7-CGE (30) 8, KPs 4BJI 6AZ (4) 7-10, KV4CI (15) 9, KX6AJ (8) 8-9, KZ5s EC (19) 7, KO (18) 5, LUs 1ACF (9) 5, 1ZC (23) 4, 2SA 2WP (4) 8, 3DMD (5) 8, 5ED (12) 8, 6FA (9) 5, 7AU (11) 6, 9AX, LZs 1KDZ (12) 2, 1KSZ 2KSK (5) 3, MP4s BEE 22-23, BEQ 22-0, OAs EM (14) 5, FW (37) 6, PF (9) 5, OE1EF (11) 2, ON4IZ, OR1VN (15) 5 of the far south, OX3s AY (1) 5, LP (4) 2, OY8S, PJ5SA, PYs 2BBL (3) 5, 2CQ (7) 6, 8DI (16) 5, 9IIL (25) 6, a dozen SPs and even more YUs, TU2AU (5) 23, UAs 1KED 2AK 0AG 0KCA 0RI 0RL, UB5s IF KDS KFW (2) 2, KGL KJE (11, 2) 2, LR QT, UG6GK, UJ8KAA, UM8KAA 23, UP2s BN (5) 1, KCF KNO (15) 1, UQ2KBC/UL7, a hatful of VKs including 1RD (10) 9, 7GK, VPs, 2BV 2MV 2SC (7) 9, 4DS (5) 0, 5GT (8) 6, 6BW (9) 6, 6BX 10, 6LA 6LJ 6PJ 9FO, VRs 1B (6) 12, 2DK 19, 2EG 20, 3II (6) 8, VU2PF 21-22, XEs 1JH 2DX 6, 2JS, YNs 1AA, ITA 8-9, YOs 1CT 6XI 8KAE (2) 1, 8MG (28) 1, 8QK, YVs 1AB (70) 5-6, 2GI 3FB (5) 0, 5AXA (12) 2, 5BHR, ZC5AL 20, many ZLs, ZSs 1XR 6AP/KC4 (12) 6, 3A2AJ, 4U1ITU, 4X4DX, 5B4-JF, 5J3GN (3) 5, 5Z4IV, 7Q7RM, 7Z1AA, 9G1AA, 9G1FE 23, 9L1TL and 9M2RI . . . . . Novice 7-Mc. diggers KN3ZOL, WNs 5JEY and 6JLD clicked with F3AB, KH6-FNH, KL7AZN, KP4ACL, VQ2AG, XE1NNN and WP4-BOR, no easy squeeze on forty.

40 **phone** is almost a shutout on our side thanks to those *Radio Petrarias*, but the clubs press points to 7-Mc. voice doings by EA3OT, EP2AZ (65) 21, F2GB*, HR3HH, IIGUG*, IS1CWN 20, LX3QT, MP4s BBW (60) 20, BEQ 21, OA4MX, OX3JV 21, OY7ML, PY7AKT, PZ1AX 22, SV1AB, VKs 2ADA (45) 21, 2AVA 3AHO 3ATN 3BM 3XM, VQ2WR, VSs 1LP 23, 9MB 20, 9MG 21, XE2HHG, YV-5AMH, ZSs 1BK 1ZH 21, 6FN (45) 21, 4U1ITU, 4X4s DH DK 20, 5A1TW 22-23, 5Z4AA 21, 6O6BW 22, 7Q7PBD (60) 19-20 and 7Z1AA 21, the stars blinking for lonely a.m.ers.

80 c.w.'s snappy season is coming up. Meanwhile, W7DJU, K5JVF, WB2ALF and WN5IDX scout the ground for HA3GF, JAs 1CEU 2WB 7LK, OE4SZW, some Gs and DJ/DLs, TF3KB, UAs 6DM 9CB, UH8DC 20, UW9AP, VKs 1RD 3RP 3XB 4JF 5GP, VQ2CR 2, VR2s DK 19, EG 10, XE1JM, ZLs 1AXB and 4GA . . . . . 75 **phone** features the straight-a.m. solos of F3CG, GM3KJZ, HA3GF, HB9SX, OE2GJL, OKs BM MF, ONs IM KK, OZs 2TP 5CW, PA0s NT SCH, SM5CCH, UB5WJ, UC2LL, and YU2ACD, plus s.s.b. offerings by DJ0CE and IS1CWN.

160 c.w. tigers who knocked off for the summer missed some superior DX reported by W1BB. Stew scored surprising July two-ways with VQ2AS, ZSs 4PB 6BCT and 9L1HX between 0400 and 0500, and reports a June QSO between JA3AA and VS1LP to open the Japanese 160-meter campaign. JAs 6AK 8YAU and others are lurking on 1880 kc. to get their share . . . . . VE2UQ roamed the far north from Thule to P.E.I. in mid-July to provide summer sport for 1.8-Mc. men . . . . . VKs 2ADA 2HC 2SA 5KO and ZL3OX are among the Down Under gangnow probing the top-band noise level for long-haul triumphs. Looks like a lively 160-meter DX season ahead!

* * *

Next month we'll inspect 20's autumnal mood with the help of (c.w.) Ws 1ASZ 1DYE 2BTQ 3HNK 6KG 7DJU 8DSO 8TRN 8YGR, Ks 1QHP 3SLP 3UXY 4IEX 7CAD 0HIL, WAs 2KDT 2KSD 2WIJ 4SHD 5ABG 5AER 9FMQ 9ICQ 0APN, WB2JQC; (phone) W6KG, Ks 1QHP 3SLP 0HIL, WAs 2KSD 5ABG 9FZQ, XE1NE and s.w.l. C. Maher, plus other mailbag visitors. At the rate things are going, 160 may merit another check, too, so be around!

Where:

HEREABOUTS—Plenty of "QSLers of the Month" this month: CN8GB, DU7SV, EI9S, EP2RC, FG7XT, FO8AA, G3PFE, GI3KYP, GW3NWV, HI8MMN, HKs 4DP 4EB 0RQ, HP1CN, IS1ZUI, JA5FQ, Ks 2DCN/TL8 7VAX/KS6, KA2BW, KG1AA, KH6EZM, KL7s MF PI KV4s CF CX, MP4BEQ, PY2ARX, SM5s BGK CZY SV0WPP, TG9SC, VO1AW, VP8GQ, W5FGO/mm, WP4-BQA, YN1s MAN SL, YS1GMI, YV5AJ, ZD3A, ZK1AR, ZL3JO, 5A3TX and 9Q5AB, plus QSL agents Ws 2CTN 5EGR, Ks 3AHN 8HB 5AWR 6VNU and WA4STL, all nominated for particularly prompt pasteboard processes by "How's" correspondents Ws 4RLS 8TRN 8YGR, Ks 3OJK 3SLP 4CER 8RDE 8RXD, WAs 2WIJ 4JJY 6VAT 9FZQ 9ICQ and WN4PXP. K4CEB gives the U.S. Post Office a pat on the back for expeditions QSL service rendered, too. Got any candidates you'd like to see recognized here? . . . . . Help! K8RDE needs current data on old AP2NK, GD3UB, PY0AC; WA2UKA wonders about FM7WB; and WA5ITA pursues the 5A5TR he QSOd as WN5ITA not long ago . . . . . Help offered: W7VRO, K7CAD, WAs 5ABG 8ECH and WB2FXB invite arrangements as QSL managers for needful overseas operators, the rarer the better . . . . . VP2SC tells K5JVF his QSLs come via bureau . . . . . XE1NE reminds us that Mexico's LMRE relays incoming QSLs to members only. Cards for Alberto and other nonmember XEs must go direct . . . . . W8EQA requires s.a.s.e. and GMT concerning his managership o-

VP2AX confirmations . . . . . LeRoy Waite of NNRC, proprietor of the SWL/QSL Bureau, 39 Hannum St., Ballston Spa, N.Y., reports the handling of 1723 pasteboards during the first half of '64. If you're one of the 187 WPE-type s.w.l.s who haven't yet claimed their veries rush a self-addressed stamped envelope to Roy at the address given.

AFRICA—"5A1CW is here in Houston for one or two years," discloses WA5ABC. "He checks into my shack regularly, so anyone with QSLs for him can send them to me. Bob expects another transfer soon. We both hope it's a rare spot!" . . . . . "Two International Reply Coupons get a return QSL from 7G1IX via air," reports W8DSO. "OK1GL was the operator." Jack used the address in the list to follow . . . . . K1QHP, awaiting his ET3 call, solidifies plans for a French Somaliland DXpedition later this month. "W/Ks desiring QSLs direct should include U.S. airmail postage with their QSLs, non-W/Ks should send IRCs with theirs, and all others will be answered via bureaus." . . . . . WB2FXB disclaims connection with 5T5 QSL matters . . . . . 7QDI-ZD6I commemorative confirmations hit the mails in August. ZD6PBD then became 7Q7PBD, so 7Q7s apparently will keep their old ZD6 suffixes . . . . . WGDXC says that VQ8BEC-VQ9HB QSL aide G8KS changed QTH to 31 St. Leonard Rd., Eastbourne, Surrey, England.

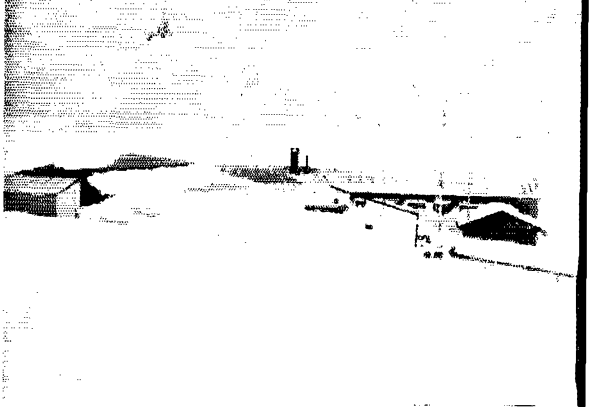
OCEANIA—"I am now QSL manager for KG6IF of Marcus island," affirms K7CAD. "Harry, the station's new operator, finds many unanswered W/K QSLs. I'll attend to them as soon as possible. Duplicate and new requests must be accompanied by s.a.s.e." . . . . . "There *is a VR1AO but it's a commercial outfit, not a ham station.* WA9HLG learns this from the Solomons P&T authorities. Similarly, K7s TNY and RBM of K7UGE are told by VK2AP that somebody is making periodic unauthorized use of his call.

EUROPE—ON4UQ (K2BKU), through W1WPO of the ARRL DXCC Desk, points out that Belgium's UBA does not relay QSLs for nonmembers, himself included. This policy is traditional with many overseas QSL bureaus. Unless you don't mind a low-percentage QSLs return, ship your cards to overseas stations via bureaus *only* when instructed to do so by the stations concerned. ON4UQ prefers W/K/VE QSLs via his K2 address, others to the address specified in the catalog to follow . . . . . Regarding TF2s WIU and WIX, WA9JWR says Box 12, Navy 103, FPO, New York, N. Y., 09597, will do nicely . . . . . WN4PXP commends the DJ/DL gang for high QSLing efficiency. Jim has 19 cards from 21 Germans worked . . . . . W3HNK is told by the Moscow bureau there is no UP2KC. Might be UP2KNN with spacing insufficiency . . . . . Newly licensed ON5LV vows 100-per-cent QSL from Bruges.

SOUTH AMERICA—"I am looking for a QSL manager," writes YV5BIG. "Perhaps you can recommend one." We aren't matchmakers in this regard but several candidates appear in a preceding paragraph. YV5BIG in turn does QSL chores for his brother, CX3AAV . . . . . PY2SO tells W1TS of ARRL that Connecticut DXers leave much to be desired in the way of QSL response. "And hams in Ga., Iowa, Ky. and N.H. are even worse. My WAS is now 49/45, no Montana." Sonia hunts through *QST* for Montana clews and is not much cheered by news that "Two more Montana hams have moved away to California, the Montana 144-Mc. traffic net is in full bloom, two Montana Novices are now Technicians interested in moonbounce, and the Montana 75-meter rag-chew net has three new members." Hi! . . . . . "As of August 1, 1964, I am QSL manager for YV3KV," records WA1AEB . . . . . RCP's ZP5ML advises that ZP6EE is purely figmentary . . . . . Time for our glossary of specific postal possibilities. In using them bear in mind that each is necessarily neither complete, accurate or "official". Good luck! . . .

CM5FS, Box 67, Matanzas, Cuba
CN8GB (via W2CTN)
CX1RY (via RCU)
CX3AAV (via YV5BIG)
ex-DL4BS, R. Lawson, 3681 Hedgewood Dr., Winter Park, Fla., 32789
ex-DL4DL-F7ER-M1QHP-3A2BN, A. Kemmesies (K1QHP), Opns. Co., 4th USASAFS, Box 302, APO 843, New York, N.Y.
DM3ZOL, E. Bahr, Glashutte/SA, Luchauer Str. 7, Germany
EL2AE, Box 98, Monrovia, Liberia
EL8B, S. Larson, Sandelsgatan 25, Stockholm No., Sweden
F0AB (to ON5DO or via UBA)
HC1AO, P.O. Box 2977, Quito, Ecuador
HH6DD, Plantation Dauphin, Cap-Haitien, Haiti
HK3ASJ, Box 2063, Villavicencio, Colombia
HK4AHT, G. Restrepo, Box 4346, Medellin, Colombia
HK0MO (to HK5MO)
HK0QA (via LCRA)
HK0RQ (via W2CTN)
HL9KH (via W6KTE)
ex-KA2IJ, K. Nose, KH6IJ, 2425 Coyne St., Honolulu, Hawaii
KG6IC, USCG Loran Stn., APO 815, San Francisco, Calif.
KG6IF (via K7CAD)
KH6AFJ/KS6 (to KS6BN)
KS6BN, R. York (*KH6AFJ*), c/o FAA, P.O. Box 8, Pago Pago, U. S. Samoa
KZ5EC, Box 169, Ft. Davis, C.Z.
LU7AU (via RCA)
LX3AX (via ON5AX)
LX3AZ (via ON5AZ)
OH2s BQ 0 QV/0 (via WA9AXX)
ON4UQ, W. Cruikshank (K2BKU), Box 331, Antwerp, Belgium (or to K2BKU)
ON5LV, L. Vervoort, 72 Moerkerkse steenweg, St. Kruis, Bruges, Belgium
ON5PD, Dr. P. Duren, 1 rue Rebonmoulin, Ciney, Belgium
ex-OQ0PD-9U5PD (to ON5PD)
OX3LP (via OZ1LP)
OX3MN, Holsteinsborg, Greenland
PJ2MI, J. Maria, P.O. Box 383, Willemstad, Netherlands Antilles
PY1XW, P.O. Box 477, Vitoria City, Brazil
PY9HL (via LABRE)
TF2WIU-K5YAA/VO1 (to K5YAA)
TF2WIX-WA9JWR/VO1 (to WA9JWR)
TG9GZ, J. Clarbo, c/o Danish Embassy, Box 25a, Guatemala City, Guatemala
TJ1AC, F. Bucher, c/o Electricity Corp., Victoria, West Cameroons
UC2WP, A. Prockorov, P.O. Box 19, Witebsk 1, W.R.S.-S.R., U.S.S.R.
VE1AJR/SU, UNEF Base P.O., Beirut, Lebanon
VP1TA, Box 200 or Box 488, Belize, Br. Honduras
VP2AX (via W8EQA)
VP2KT, T. Henry, Greenlands, Basseterre, St. Kitts, W.I.
VP6AQ, J. Bond, St. Peter, Barbados, W.I.
VP8HJ (via RSGB)
VR4EE, Forest Dept., Honiara, Guadalcanal, Solomons
VU2LE, V. Balakrishnan, 8 Kanna Pillai St., Karaikudi 1, Ramnad AP, India
W0PI/KM6, H. Austin, Box 26, Navy 3080, FPO, San Francisco, Calif.
WA6LED/KG6, W. Broder, Box 116, Navy 926, FPO, San Francisco, Calif.
WB6BZS/KJ6, L. Guthrie, HN Box 213, APO 105, San Francisco, Calif.
XE1JH, P.O. Box 48, Mexico, D.F., Mexico
XE3EB, Box 329, Merida, Yucatan, Mexico
YV2GI, Box 299, San Cristobal, Venezuela
YV3KV (via WA1AEB)
YV5BLP/8 (via RCV)
ZP5EE, C. Brown, P.O. Box 1181, Asuncion, Paraguay
5A1TO, P. Green, Radio Stn., Misurata, Libya

LU4ZI has been active for many years from Deception island, South Shetlands. Current operators (l. to r.) Pagini, Bienati, Chamorro and Sueldo talk over the DX situation in cozy comfort while subantarctic winds tear at the isolated outpost's antenna rigging. *(Photos via W6KG of NCDXC)*



These Australian single-sideband specialists gathered over 807s at Hamilton, Victoria, in May. Front, from left to right, are VKs 3ADD 3APH 3AEM 3IT 3PZ 7XL 3XO; second row, VKs 5MF 2AEB 3AWL 2AXD 2DQ 3BM 3JA 3WK 3VH 5RD 5EF; third row, VKs 3JX 5XB 5HY 3ES 5NN 3AHT 3RE 3AG 2QJ 5DC 3AHC 3AC; rear, VKs 3ZX 3UJ 3AZM 3XM 2AVA 3TW 5QR 3ZU 5RO 6KJ 3APS and 5KC. Many of them are workable around 7095 kc. *(Photo via VK5NN)*

ex-5A3TQ, R. Crowther, 236 Westwood Ln., Welling, Kent, England
5A3TX, T/Sgt. C. Waterhouse, 1950th Comm. Sqdn., Box 1181, APO 231, New York, N. Y.
5A4CW (to WA5ABG)
6O6BW, Box 1393, Mombasa, Kenya (or via WA4FXE)
6W8DN, M. Perrin Jean, SEI Rufisque, BP 3024, Dakar, Senegal
7G1IX, Box 477, Conakry, Republic of Guinea
7Q7PBD, P. B. Dodd, P.O. Box 57, Limbe, Malawi
9A1FT/M1FT (to DL7FT)
9L1TL, % 367 Parrs Wood Rd., Didsbury, Manchester 20, England
9Q5PP, CFML, Malanga, C.R.

Thanks for this rundown go to **Ws** 1ASZ 1DYE 1WPO 1YYM 8DSO 8YGR, **Ks** 3HTZ 3SLP 3UXY 4IEX 5JVF 7CAD 8RDE, **WAs** 2KDT 2KSD 2UKA 2WIJ 4HAA 4SHD 6VAT 9FZQ 9ICQ, **WB6AKZ**, XE1NE, DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2CM), 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, K1NOL), Northern California DX Club *DXer* (W6WX & Co.), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU VDV WWP) and West Gulf DX Club *DX Bulletin* (W5IGJ). Thanks, indeed!

Whence:

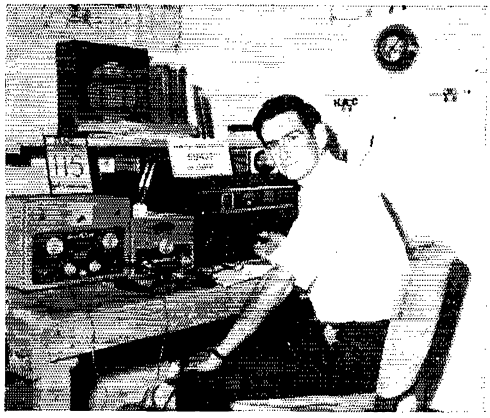
ASIA — ARSI (India) and RSC (Ceylon) invite your participation in the first VU2/4S7 DX Contest to be held (phone) from 0600 GMT October 10th to 0600 the 11th, and (c.w.) October 17th-18th, same times. The usual RS- or RST001, RST002, etc., serials will be exchanged, everybody working everybody. Non-VU2/4S7s earn 2 points for each QSO with each VU2/4S7 per band, and 1 point per contact per band with stations in the rest of the world. Logs showing date, GMT, calls of stations worked, band, serials swapped — separate tabulations for each band — accompanied by a summary sheet indicating your call, name, address, equipment description, total score and a signed declaration that rules and regulations were observed, must be mailed no later than November 15, 1964, to ARSI Contest Committee, Post Box 534, New Delhi 1, India, to qualify for possible certificates of meritorious performance . . . . . W9WNV of HL9KII fame may sign an XU suffix in Cambodia for a week or so with FCC clearance, any time now or already . . . . . K2EVW, a dental student, spent his summer vacation as radioman aboard SS *Fort Hoskins*, visiting hams and exotic scenery in the Bombay area. . . . . "Managed to work a lot of Europeans as KA2IJ," chuckles KH6IJ, returning home to Honolulu after a brief teaching assignment in Japan . . . . . XE1NE says VU2NR isn't having much luck in efforts to obtain official permission to activate traditionally rare Indian Ocean regions . . . . . "I'm leaving this location in September," writes VS9OC's Earl to K1IGO, "but I'm hoping some other operator will keep the club open, especially on c.w." . . . . . JT1KAA is a popular sideband item on 14,255, 14,296 or 14,324 kc., while JT1s AH and KAE keep the c.w. bunch busy . . . . . VS9MH's 14,112-kc. s.s.b. is available at 1500-1630 GMT almost daily.

EUROPE — Forty-meter specialists will welcome RSGB's 1964 7-Mc. DX Contest to be held (phone) from 1200 GMT October 31st to 1800 November 1st, and (c.w.) November 21st-22nd, same times. Non-British Isles DXers will strive to capture G-GB-GC-GD-GI-GM-GW stations, trading the customary RS- or RST001, RST002, etc., serials. North American entrants earn 15 points for each British Isles station worked, plus a 50-point bonus for the first contact with each British numerical prefix (G2-3-4-5-6-8, GC2-3, etc.). Uniop or multiop entries, clearly typed or written on one side of foolscap-sized paper, must indicate in order QSO date, GMT, call of station worked, serials sent and received, bonus points claimed, points claimed, and be accompanied by a summary sheet bearing your claimed score, call, name, address, equipment description and 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." Filings go to Contests Committee, Radio Society of Great Britain, 28 Little Russell St., London, WC1, England, postmarked no later than December 14, 1964, to be eligible for possible certifications of outstanding performance. Let's give *Radio Petrunia* a good going over! . . . . . Genoa's Institute of International Communications invites amateurs throughout the world to collect QSOs with I1-IS1-IT1-MI-HV1 stations from zero GMT on the 9th of this month to 2400 the 11th, using c.w. and/or phone on 7 through 28 Mc. Scoring depends on which of the International Telecommunications Union's 75 zones you operate from, so the usual submitted log and contact summary should suffice, mailed to ICC, Genoa, Italy, postmarked no later than January 31, 1965. Or you might play it safe by obtaining more complete entry and scoring specifications from the society before filing your results. Anyway, contacts with Liguria (Genoa area) IIs are worth twice as much as other Test QSOs, and if you're lucky enough to work commemorative station IIIIC during the test period your whole score is doubled . . . . . Roumania's CCSR sponsored a world-wide DX contest centered on YO QSOs over the first week end of August but the announcement reached us much too late for inclusion here. Perhaps you caught the word via W1AW. (Better make it a habit to audit the ARRL Hq. station's daily bulletin transmissions for such news items arriving too late to catch *QST* deadlines.) Moreover, if you happened to hook a batch of YOs between the 5th and 21th of August you may have qualified for the YO-23A certification offered by Central Radio Club, P.O. Box 95, Bucharest . . . . . S. Larson, Sandelsgatan 25, Stockholm No., Sweden, offers info on a WSRA diploma based on QSOs with Stockholm area SM1s . . . . . DL4BS notched six kiloQSOs from Germany before returning to Florida in July. Russ accomplished WAS and other DX achievements but figures his

30-minute 7-Mc. s.s.b. two-way with K6AHV a feat equal to any. (*Radio Petrunia*, where were you?) . . . . . K5YAA and WA9JWR respectively sign 'TF2s WIU and WIX on 14,080-kc. c.w., 14,115-kc. sideband . . . . . Lou Vervoort, editor of UBA's popular *CQ* for many years, finally broke down and joined the ranks as ON5LV. He's on 20, 40 and 80 c.w. with 50 watts, an R-107 receiver and 3.5-Mc. dipole. Incidentally, QSOs with ten Bruges ONs may qualify you for the WXBAS diploma, details available from ON4IB . . . . . PY2SO tells W1TS that OZ1TL worked a hundred countries on a mere ten watts . . . . . Continental comment culled from club organs: W2SAW tried his DX luck from the other end as 4U1ITU in mid-August. . . . The French society's F8REF disseminates DX news in French on 20 phone around 1830 GMT. . . . HAMU expects HV1CN to be available regularly at 1900 GMT, Saturdays, 14-Mc. s.s.b.

AFRICA— Ethiopia is the new bailiwick of K1QHP (ex-DL4DL-F7ER-M1QHP-3A2BN) who should be breaking in his new ET3 label by now. Al is enthusiastic about DX prospects in Asmara: "Really amazed at the reception here. Asians boom through like locals: BY1PK was S9 this morning. South Americans are plentiful in the evenings. Europeans almost any time, and W/Ks start rolling in after 1500 GMT. I feel sure, with a little effort, it should be possible to pick up a hundred countries in a matter of days." ET3 isn't entirely rare enough for a true DX man, so Al plans a visit to FL-land next month. "With luck I'll cover the 1155 miles to Djibouti by November 5th and remain active in French Somaliland till the 24th or 25th. If I'm fortunate to have another operator with me we'll have 'round-the-clock operation. A KWM-2 will feed improvised antennas from 3.5 through 21 Mc., concentrating on frequencies five kc. above the lower band or subband limit. I will be listening on my own frequency. *Requests for QSY from* c.w. to phone or vice versa will not be honored unless lack of activity, or conditions, warrant this. Let's play it cool — every station heard will be answered." . . . . . W8GIU, QSL aide to CR6FW, learns that Angola ham installations are subject to strict periodic inspection. No 160- or 6-meter privileges there . . . . . W4RLS corrects his Sunday 1900 GMT sked frequency with ZD3A. It's 14,005 kc., s.s.b. due later . . . . . W8DSO says that big 7G1IX 14-Mc. signal stems from a kw.-fed dipole . . . . . K1QHP has it that RSEA secretary 5Z4IQ brings his HT-32 and HRO back to England this month . . . . . Africa addenda via the clubs press: Guinea local QRM is on the upswing with 7G1s EZ IX and L (W3ZBG) all on 20 c.w. at 1800-2200 GMT. . . . MP4BBR and 5Z4ERR, with VQ8AM, reconnoiter Rodriguez isle for early action. . . . Egypt notes: SU1IM shows up near 14,026 kc. at 0300 GMT, VE1AJR/SU of Gaza likes 14,115-kc. sideband around 2100-2300 GMT, and Walter of 4U1ISU knocked off for return to Switzerland. . . . CRs 5MA and 6SA are mentioned in some connection with multimode multiband Annobon isle maneuvers this month. . . . KP4CPR anticipates becoming a ZD8 shortly. . . . TJ8s AG and YL continue to make 15 a.m. worth watching, plus or minus 1830 GMT.

OCEANIA— "I've been inactive for several years," admits KH6AFJ, now signing KS6BN at Pago Pago. "I look forward to resuming activity from Samoa." Bob will be *plenty* active, we surmise, unless he keeps the plugs pulled out . . . . . Don't forget the VK/ZL/Oceania DX Contest on the first two week ends of this month. Details appeared last *QST* . . . . . "How's" loses its ace Hawaii reporter with W2BTQ/KH6's move to Japan. "With luck I'll be back on the air as a KA2 in October," writes Turk. "Ten months in Hawaii with my DX-20 produced WAC, 43 countries, 42 states and 35 Japanese prefectures. It's a



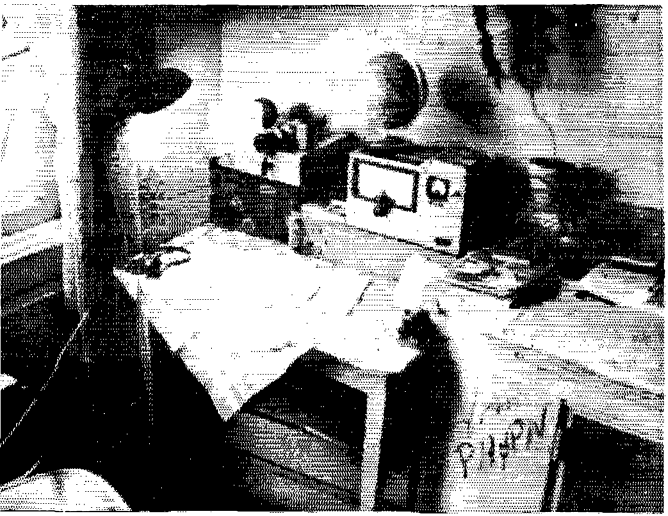
5B4JF, a fresh entry who likes 15-meter c.w., still manages QSOs from troubled Cyprus. (*Photos via W1s BPY and WPO*)

revelation what low power can do unhampered by the mainland's QRM." . . . . . Got a flock of VK QSLs? They may fit you out for DUA, the Down Under Award, a sheepskin administered by VK4SS . . . . . KH6CCL/-VE7 is probably glad to get back to Oahu after sampling west coast summer QRM . . . . . KH6FBM is among several Hawaii OMs threatening DXtensive 160-meter action in the 1964-'65 season, according to K5JVF . . . . . More Oceaniagrams courtesy club journals: ZL2AWJ's Chathams venture is due next month or next. . . . GW3-PFW expects to sign a mainland VK call by Christmas-time. . . . CR8s AD and AE flit phantomlike between 7, 14 and 21 Mc., phone and code. . . . VK0PK is a Heard isle possibility by December.

HEREABOUTS— Members, guests and interested amateurs are invited to attend the annual New England DXCC dinner meeting at Motel 128, Dedham, Mass. (junction of Routes 1 and 128), on the 17th of this month. Festivities commence at six p.m. — check pronto with W1MV for attendance arrangements at five dollars per registration including very ample eats . . . . . Dispatches from the Novice DX front: ARRL Assistant Secretary W1ECH reports issuance of another WAC to a Novice DX hound. Belongs to KN3WGG, now K3WGG. . . . Regarding WN5HZY's recent WAC, WA5ITA writes, "I know Steve personally. We both worked our final continent on the same day by hooking JA4ACH but I still need 5A5TR's QSL to confirm my Novice-made WAC." . . . WN5IDX writes, "You must be kidding about off-the-mainland work on the 80-meter Novice band. With the noise level around here I'm lucky to log a few VEs and a QSO with Mexico." . . . WN4PXP's current 62/45 countries worked/-confirmed is one of the highest Novice DX totals we've run into since the late-50's sunspot splurge when a few WNs cracked the Century Club. Jim uses a 70-watt 6146 rig, SX-117 and Hy-Gain beam on 21 Mc. Any "N" fellows doing as well? . . . . . Tech tip from longtime "How's" regular W7DJU: "Replacing my 866As with 3B28s got rid of all my hash and arcing problems."

(*Continued on page 164*)

PAØPN's installation at Middleburg is ready for the new 160-meter season now getting under way. A year ago Piet scored the first Holland-U.S.A. 1.8-Mc. contact, a QSO with W1BB. Ten watts, a German war-surplus receiver and a 60-ft.-high long-wire do the job. First licensed in 1930, PAØPN also has a number of v.h.f. DX firsts in his log. Photos via W1BB



CONDUCTED BY JEAN PEACOR,* K1IJV

Whistle While You Work

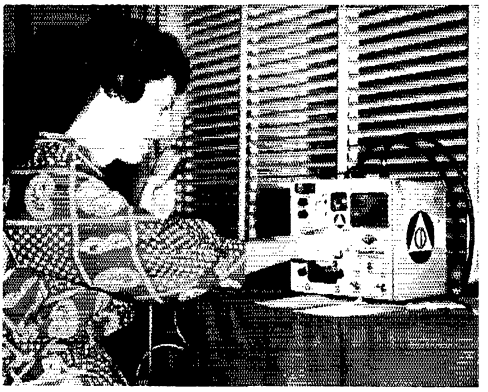
ARE you happy in your work? If you were to devote an entire holiday weekend to work, would you be inclined to be so pleased in having done it that you would write a note of thanks to your boss for having allowed you to give of your time? It does happen and Carolyn Currens, W3GTC, has provided the perfect example.

Carolyn has just witnessed the successful completion of another Powder Puff Derby during Fourth of July weekend. As manager of amateur radio activities, which provide complete national coverage for the event, for the seventh straight year, Carolyn can vouch for this being the typical ham's reaction. Close to 100 amateur radio operators throughout the country willingly give of their time to assist in this race each year and many write such notes of thanks to Carolyn thanking her for the privilege and pleasure. It's doubtful that the word *work*, as such, ever crosses the minds of any radio operators who assist.

Amateurs at the start of the Powder Puff Derby from the Fresno Amateur Radio Club.

Officially designated the All-Woman Transcontinental Air Race (AWTAR), the Powder Puff Derby is the longest and largest speed race in the world for light airplanes. Its annual transcontinental U. S. course, changed each year, has been held in July since 1947 and measures over 2500 miles. The race provides the major annual flight activity of the Ninety-Nines, international organization of licensed women pilots and founded by Amelia Earhart in 1929.

The Derby has covered 3,377,573 race miles



Operating a vital 2-meter linking station at the hotel near the finishing point of the race is Barbara Anders, W3WML.

with 1567 contestants, been welcomed by 38 states and 70 different cities. It provides an incentive to women to learn to fly and to upgrade their abilities along with providing a similar incentive to all who assist in the race's success at the many stop-over points. Such an occasion provides the incentive for the searching out of all advanced techniques and newest equipment not only from the aviation standpoint, but for the radio amateurs too.

Amateur radio is but an integral part in the overall picture for the success of the Derby. Hams coordinate with the National Aeronautic Association, Federal Aviation Agency, Flight Safety Inspectors, U. S. Weather Bureau, Ninety-Nines Chapters, Coast and Geodetic Survey, Chambers of Commerce, Flight Service Stations, State Aviation Officials, Air Traffic Control, Tower Operators, Air Explorers, Wing Scouts, Civil Air Patrol, State Governors, and the hundreds of other groups completing the operation.

For thirteen years radio amateurs have participated in Powder Puff Derby activities. As manager of these radio activities, Carolyn's job is to provide efficient communications in the form of a radio net which will cover the air race from start to finish and include all stop-over points. Through the net all pertinent information is relayed to points in all directions. In order to accomplish this, her work begins in January and continues right up until race time in July. Not only Carolyn, but all who assist, seem to "whistle while they work" and spread much good will

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

throughout the country on behalf of amateur radio.

Much well deserved credit goes to the following who assisted this year:

Fresno, Calif.
Fresno Amateur Radio Club; Chairman, K6ACO; RTTY, W6ZFN; WA6DRH; WA6ZUG; W6DUD; WA6VFU; K6BKZ; WN6JRL; K6PKQ; WA6INE; WB6IXF; WB6ETQ; W6FEA; K6VKT; WA6FAJ; W6JPS; W6RYN.
Las Vegas, Nevada
Las Vegas Radio Amateur Club; Chairman, W7VYC; K7PPE and his XYL, Pat; K7RBM.
Winslow, Ariz.
Chairman, W7REO; W7PJY.
Albuquerque, N. Mex.
Chairman, Roger Muehmore — Kirtland A.F.B. Mars Station.
Amarillo, Tex.
WA5EMP; WA5EKN; WA5DVA; WA5DHF; W5EBS; K5FVH.
Oklahoma City, Okla.
Aeronautical Amateur Radio Club; Chairman, K5LIL; W5EHC; K5YMV; W5ZZG; WA5GCS; W5VCJ; W5LOW; WA5BEK; WA5HWH; K5VFR.
Fayetteville, Ark.
Amateur Radio Club of Univ. of Ark.; Chairman, K5SGH; K5ALU; WA5FHR.
Cape Girardeau, Mo.
Southeast Mo. Amateur Radio Club; Chairman, KØQGU; WØPLJ; WØQMF; KØFCW; KØYIM.
Lexington, Ky.
Blue Grass Amateur Radio Club; Chairman, K4KJQ; K4KJR; WA4LVX; WA4MZU; WA4IMF; WA4GQO; W4JSH; WA4ELK; K4CSG; W4KWO; RTTY, W4MGT.
Morgantown, W. Va.
Chairman, WA8IMY; W8JAV; WA8MRN; WA8IHMU; WA8FMA; K8KTP; WA8BSE; K8KZF; W8RXN; W8RXO; W8GUL; WN8LNU; WN8LYY.
Atlantic City, N. J.
Chairman, W3LMG; K2BKG; W2ZKR; WA2OZQ; WB2IGD; W5EUL/2; K2CIR; WA2WPM; WB2GUK; W2TUR; W2OTB; WB2FPV; W3WML; Bob Mayer and Joe Hassen (calls unknown).

Post Convention Highlight

Those YLs attending the YLRL Convention held in Columbus, Ohio in June were delighted with a tape recording of many distinguished YLRL members, since it was a combined tape of many of the YLRL founders. To honor those charter members, the convention committee had beautiful plaques which were presented to all such YLs in attendance.

Lida King, W1GQT, of Holyoke, Mass. was one of the charter members who was unable to attend but whose voice charmed many via the tape. Since Lida's plaque could not be presented at the convention, Eunice Gordon, W1UKR, made a personal presentation for the committee upon her return to western Mass.

The pride of being a YLRL charter member shines through as Lida King, W1GQT, is presented with her charter membership plaque in celebration of YLRL's 25th anniversary by Eunie Gordon, W1UKR.

Carolyn Currens, W3GTC, Manager of all Powder Puff Derby amateur radio activities for the 7th year is shown operating the Collins-equipped station provided by Bill Dostal, WA2GMN.

Lida has been well known on the ham bands as an avid c.w. gal, spent a great deal of time aiding civil defense work, and has enjoyed many a fine hour of rag chewing since becoming licensed in 1933. Besides being a charter member of YLRL, she was also First District Chairman and has always been a very interested member. Lida's rig is temporarily off the air, but she hopes to be active again very soon so be watching for W1GQT.

Results 1964 YL VHF Contest

	Score
Winner—Helen Harris, W1HOY	31
Second—Maxine Hanberry, WA6AOE	16.25*
Third — Mary Baucum, K5RWR	15.00*

Others participating were WA8IAQ, 1.25*; K1MGP, 13.75*; WA6QQH, 6.25*.

This is the last such YL VHF contest. A change in the type of contest has been made at the request of the entrants and YLRL members at the Columbus convention. A v.h.f. section will be added to YL/OM Contest rules next year. Details of the new rules will appear in the January, 1965 YL Column.

Attention: All YLs
25th YLRL Anniversary Party

Contest Period — *c.w.*
Starts: October 21, 1964, 1700 GMT
Ends: October 22, 1964, 2300 GMT
phone
Starts: November 4, 1964, 1700 GMT
Ends: November 5, 1964, 2300 GMT

Eligibility: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members only are eligible for the cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs will not count.

Operation: All bands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

Procedure: Call CQ YL.

Exchange: Station worked, QSO number, RS or RST, ARRL section or country. Entries in log should also show the Time, Band, Date, Transmitter and Power. (Please know your own ARRL section or country. Section list available for s.a.s.e. to V. P.)

Scoring: (a) c.w. and phone sections will be scored as separate contests. Submit separate logs for each contest.

(b) Multiply number of contacts by total number of ARRL sections and countries worked.

(c) Contestants running 150 watts input or less at all

The Los Angeles Young Ladies Radio Club (Laylrc) installed new officers in June. Shown (l. to r.) are: W6JCA, Betty Ekstrand, Treas.; K6ELO, Roxy Griggs, V. Pres.; W6QYL, Martha Edwards, Pres.; WA6UBU, Esther Gardner, Corr. Secy.; WA6ISY, Myrtle Cunningham, Rec. Secy. Looking closely you will see their call letter headbands with feathers denoting princesses of the tribe, W6MWO, Laylrc club call. As president, Martha was invested with a peace pipe, a tomahawk (to keep peace with—it's rubber!) and a bow and arrow. Other officers were invested with similarly fine jewels for their offices. All are wearing corsages of white gardenias and a tiny indian head complete with braids and ribbons—all made by W6PJU.

times may multiply the results of (b) by 1.25 (low-power multiplier).

(d) s.s.b. contestants running 300 watts p.e.p. or less at all times may multiply the results of (b) by 1.25 (low-power multiplier)

Awards: Highest c.w. score — Gold Cup (YLRL Member)
Highest phone score — Gold Cup (YLRL Member)
Highest phone log and c.w. log in each district and country will receive a certificate
Highest *combined* phone and c.w. score, YLRL member only, will receive Corcoran Award

Addition to awards of YLAP: given by Arlie Hager, W4HLF, will be two combined score cups awarded to DX YLs only.

Highest *Combined* phone and c.w. score cup for DX YL in North and Central America, including the Greater and Lesser Antilles.

Highest *Combined* phone and c.w. score cup for DX YL from any other part of the world.

(DX YLs please send logs via airmail to be sure of qualifying) Logs: Copies of all logs must show claimed score, be signed by the operator and postmarked no later than November 21, 1964 and received no later than December 5, 1964, or they will be disqualified. Send copies of log to Martha A. Edwards, W6QYL, 44303 North Date Ave., Lancaster, California. No logs will be returned. Be sure it is a copy of your log that you send. Do not use carbon copy as it blurs in handling. Please use lined paper and abbreviate sections understandably, *i.e.*, L.A. for Los Angeles and La. for Louisiana, etc.

YL Club and Net News

The Minow YLs announce their first Annual QSO Party to be held starting October 12 at 1700 GMT and ending October 17 at 0500 GMT. Suggested frequencies for finding the YLs on phone are: 3880, 7260, 14285 and 21410 — 28.70 if 15 and 10 meters are open. For c.w., suggested frequencies are: 3575, 7030, 14075, 21090 and 28.09. The idea to have a QSO Party originated because of complaints that Minow YLs are too hard to find and they all plan to be especially active on all bands during this period.

A Minow Certificate is issued to any U. S. station working six Minow members in at least 3 states. DX stations contact any 3 members. Send full log data and 50¢ to Mary Ruckman, K7RBC, 1002 Fourteenth St., LaGrande, Oregon. No charge to DX. Minow members send logs to Phyllis Shanks, K7KSF, 74 McMurray, Richland, Wash. for cross-checking.

The Loaded Clothes Line Net announces that the c.w. portion of their net will start again on September 2 on 7.1 Mc. at 1600 GMT with KØEVG as NCS.

The Colorado YLs Club already are making plans for the 5th YLRL International Convention to be held there in 1968. The convention committee has been formed with Marte Wessel, KØEPE, as Chairman; KØBTV, Co-Chairman; WAØEXX Publicity; WØIJL Prizes; KØRGU Registrations, and KØWZN, WØESD, WØUTO, WØHWL.

Additional YL OM Contest Credits

A review of the published scores for the YL/OM contest in the July column has revealed that the 2nd place c.w. winner should have been Jessie Billon, WA6OET. This makes Jessie 2nd place winner for both the phone and c.w. portions. Congratulations to Jessie on her fine scores!

Credit too goes to Doneg Booth, VE3EYN, who was portable 8 during the contest and whose call was incorrectly listed in the results as VE3AYN/8. QST

NEW BOOKS

Transistorized Miniature Amplifier and Tuner Applications, by Rufus P. Turner. Published by Lafayette Radio Electronics Corp., 111 Jericho Turnpike, Syosset, Long Island, N. Y. 5½ × 8½ inches, 95 pages, paper cover.

This book is a collection of over sixty projects involving the use of Lafayette Radio miniature transistorized audio amplifiers and radio tuners. The projects are broken down into six chapters: Audio Applications, Ham Radio and Citizen's Band, Control Applications, and Tuners and Their Applications. Some of the ham radio devices are an a.m. monitor, speech clipper, sensitive a.m. field strength meter, s.w.r. meter, and a c.w. signal peaker.

Basic Radio Repair, Vols. 1 and 2. Published by John F. Rider Publisher, Inc., Div. Hayden Publishing Co., Inc., 116 West 14th St., New York 11, N. Y. 106 pages each, including indices, 6 by 9 inches, paper covers. Price, $2.65 each.

These volumes follow in the steps of the 6 volume *Basic Radio* series by the same author. Using the "Pictured Text" technique, the first volume of the *Basic Radio Repair* covers the servicing of test instruments, components, servicing procedures, servicing portable receivers and automobile receivers. Volume II involves servicing of f.m. receivers, transistor receivers and transmitters. This last section should be quite useful to radio amateurs, since it includes information on neutralization, parasitic oscillations, testing linear amplifiers, and single sideband checks.

RCA Phototubes and Photocells, by staff of Electronic Components and Devices, Radio Corporation of America, Lancaster, Pa. 192 pages, including index, 5⅜ by 8⅜ inches, paper cover. Cat. No. Technical Manual PT-60. Price, $1.50.

This manual is similar in layout and content to the popular *RCA Receiving Tube Manual*, only it contains information on phototubes and photocells. Included in the manual is information on theory and measurements, gas phototubes, vacuum phototubes, multiplier phototubes, photocells, application considerations and technical data, which give ratings, characteristics, spectral response curves, outline and terminal-connection diagrams and socket and shield information.

COMMEMORATIVE STAMP FOR AMATEURS

Official First-Day Covers Available

(ARRL Official Souvenir Envelope Design)

THE Post Office Department will later this year release a special commemorative postage stamp in honor of amateur radio operators and the half century of public service and advancement in radio communications by the American Radio Relay League. More than 100 million copies of the new stamp will be printed and sold at about 40,000 post offices from coast to coast, providing an unprecedented amount of publicity for the activities of hams.

ARRL members can be especially proud of this recognition. Just 15 special commemoratives are issued each year from among hundreds of proposed subjects.

The League has arranged for a special engraved souvenir envelope to be used the day this stamp is released. On this "first-day" the new stamp will be available only at the post office where the introductory ceremonies take place, and a special postmark (in use at just this post office for the one day) will be used to cancel the new stamp. This official souvenir envelope is designed for franking with the stamp. The "cachet" features the cover of May 1964 *QST*, thus complementing and adding historic background to the stamp itself.

The engraving on this souvenir envelope has been produced for ARRL by Artcraft, the foremost creator of first-day cover envelopes in the world. This particular "official" cachet is available exclusively from the League. There are three envelopes to a set, each with the design printed in a different color.

On the day the stamp is released, we will frank these special envelopes with the new stamp, have them cancelled with the special postmark at the first-day city, and then forward them to you or others of your choice. These collectors' items will be of interest not only to stamp hobbyists but to amateurs as well. Since the quantity serviced will be limited (only the envelopes cancelled on the day of issue will have the special postmark) they will become valuable, sought-after historical souvenirs.

ARRL offers the set of three covers for 70 cents. Prices for various items are:

Single envelope — 25 cents
Set of three — 70 cents
Pair (two stamps on same envelope) — 30 cents
Block (four stamps on same envelope) — 40 cents
Plate block (four stamps with identifying number of printing plates) — 75 cents.

The souvenir covers will make an ideal — and somewhat novel — way of saying hello to your neighbors, relatives, friends, other hams. The envelope will carry an inserted card briefly describing amateur radio and its accomplishments. Send names and addresses of those to whom you wish envelopes mailed, being very careful of legibility, together with appropriate remittance. Do not include other League matters, such as membership renewals or technical queries, in any correspondence about the commemorative stamp. Send all orders to:

Commemorative Stamp Department
American Radio Relay League
225 Main Street
Newington, Connecticut 06111

This is a once-in-a-lifetime opportunity. Send in your order today! QST

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

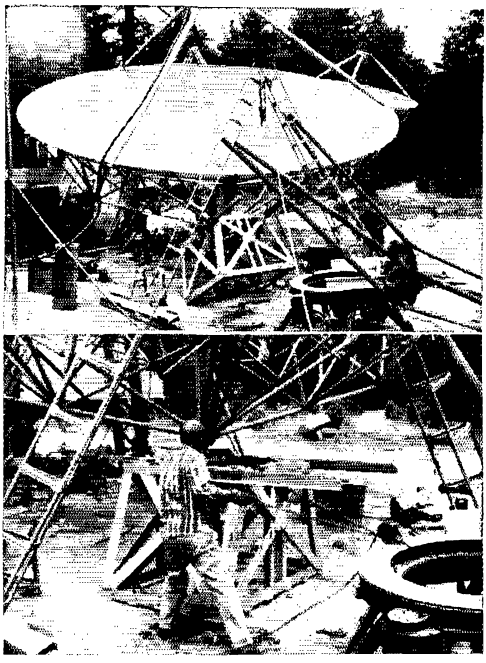
THE International VHF Conference sponsored by the East Coast VHF Society in New York City was a signal success. Such notables as HB9RG, HB9XM, VP7CX, FG7XT, W6DSJ/KP4, W2UK/KH6UK, W9WOK, W6OLO, W1HDQ, W1FZJ, W4FJ, W4GJO, and many others from all parts of the country and the world were present. The International VHF Conference, run in conjunction with the ARRL National Convention at the New York Hilton Hotel, had three sessions on three successive days. The first two sessions were concerned with international problems and activity, and the third session with moonbounce efforts around the world. At all three sessions one topic outpointed all the rest. This subject near to the heart of all moonbounce addicts concerns liaison on the lower frequencies. The successful operation of experimental type v.h.f. efforts is considerably enhanced by the ability to discuss your problems with your coworkers on a lower frequency band where communication is more easily maintained. Official bulletins which are sent out to all affiliated clubs, OES appointees, etc., are fine for disseminating information anent coming events. However, the day-to-day exchange of information on the progress of various programs cannot be expeditiously handled in this manner. The consensus seemed to favor a v.h.f.-man's net on one of the h.f. bands, however a particular frequency or mode of transmission was not agreed upon. There was a fair amount of agreement on using 7090 kc. as a v.h.f.-man's gathering point. 14090 also has been used effectively in the past. These frequencies have been used for many years in scatter, tropospheric and moon-bounce-type liaison work. It is obvioulsy not practical to have a world-wide net, as the time differential makes it impractical to use any given frequency world-wide. It is also difficult for people engaged in extensive v.h.f. or u.h.f. programs to operate a low-frequency net on a regular basis. It is, therefore, very desirable for those who are not actively engaged in some esoteric project to take over the task of establishing communication between various parts of the country and passing the information on the various projects and schedules to interested parties. Such an effort must be on a nationwide basis as the information may originate anywhere in the country, or even in the world. and a long time lag in sending it to a central distribution agency can void much of the information before it is received. What we need is a clearing house in each district to gather the information locally and distribute it to a national net which can redistribute it in local areas. So far the only semiwilling volunteer is W9WOK in the 9th call area, possibly W1HIV in the 1st call area and maybe WØMOX in the tenth call area. It is to the advantage of all serious v.h.f. experimenters to make a determined effort to make an information net on the low frequencies a going thing. We will welcome letters and suggestions from all parties concerning frequencies, types of emission, times of day and conditions in the local area. We are presently monitoring 7090 at 0300 GMT for any interested parties who would like to have an on-the-air discussion of the problems involved.

*Box 334, Medfield, Mass.

Project Oscar

W6OLO's discussion of the flight of the Oscar III Project pointed out the likelihood of an early winter launching. The desirability of understanding the mechanism by which Oscar III can be utilized was emphasized and is here emphasized again. The articles in the past issues and coming issues of *QST* concerning project Oscar III are on the "must" reading list for any v.h.f.er hoping to utilize this method of communication. It isn't that chance QSOs are impossible but rather that the maximum utilization of the project can only be realized if people are prepared in advance with proper equipment and proper schedules. A whole new set of relay records are waiting to be made. The only way to insure being in on the fun is to study up on the required techniques and have your equipment ready when the time comes. Too much emphasis cannot be placed on the use of reasonable powers during local passes and high power only in the cases where Oscar III is at the edge of or just beyond your reliable range. It does not accomplish anything for a local station to

Something to look forward to? 5 over 5 on 50 Mc. (with snow) at WAØFLL's QTH.



The joys of moonbouncing on 432 Mc. (1) In the process of adjusting the elevation angle of his 28-foot dish, W1FZJ pulls the heavy angle-iron pedestal that comprises the front bearing up on edge. (2) With a heave-ho on the pulley chain, Sam gets the pedestal back on an even keel. (3) Finally, he squints through the visual-sighting tube to check on alignment with the moon. Racks in the foreground are "spare parts." Sam keeps his operating gear under cover. Photos and caption by W1HDQ.

overload the Oscar transmitter as his signal will go no farther than that of a station that employed reasonable power and let others enjoy the circuit also. One highly unlikely but not inconceivable path using Oscar III would be the East Coast to Europe path. Anyone interested in maintaining such a schedule can get in touch with either myself or ARRL Headquarters where the information will be passed on to the proper other interested parties.

Project Moonbounce

W3SDZ has joined the ranks of the 432 moonbounce crew. Vic is receiving his own echoes and as of now has managed an exchange of signals but not a contact with W1BU. Vic is running a polar-mounted colinear array of quite sizeable dimensions and is transmitting with a relatively low-power 300-watt transmitter. A higher-power transmitter is in the works but it is interesting to note that even with 300 watts his signals are receivable by way of the EME route. Also available for schedules using his 18-foot el-az mounted dish is W4HHK in Collierville, Tennessee. Paul is available for listening tests only and is in the process of constructing a high power final for use on a moonbounce project. Anyone interested in schedules on 432 moonbounce should get in touch with either the afore-mentioned stations or with W1BU who is also operational two weeks out of each month. On 1296 moonbounce HB9RG in Geneva, Switzerland is operational and looking for schedules. Hans and his crew of hard working moonbouncers have spent several years on their project and are still continuing to improve their equipment. They have for several years been receiving their own echoes and they're looking forward to schedules with anyone equipped for operation on 1296.0000 Mc.

While on the subject of schedules and 432 Mc. I should point out that the east coast of the United States is well represented with fairly high-power well-equipped 432 stations who are looking for schedules both up and down the coast as well as inland. Among these are VE2LI, 300 watts, 64 elements; VE3BPR, 400 watts, 96 elements; W4GJO, 500 watts, 32 elements; WA4BYR, 500 watts, 32 elements; W1BU, 1000 watts, 128 elements; W4HHK, 30 watts, 18-foot parabolic; W1QWJ, 500 watts, many elements, and hopefully in the very near future VP7CX, 500 watts, 64 elements. Interested parties please communicate now as the fall season is fast drawing to a close.

RTTY First on 432

What is believed to be a 432-Mc. "first" was a teletype QSO between W2BLV and WA2EMB, both of Haddon Heights, N. J., Aug. 25. Transcript of the QSO shows that George and Bill could stand some typing practice! Anyone for RTTY on 432?

This QSO establishes the 420-Mc. band as having more types of emission currently in use than any other in the whole spectrum. Currently you can hear a.m., f.m., c.w. and s.s.b., copy teletype, or look at television on the 420-Mc. band in the Philadelphia area. Can the backers of any other band equal or top this?

50 Mc. & 144 Mc. DX (420 Too?)

VP7CX writes that he has worked only one new state this year, Minnesota, and hasn't heard any W7's at all. "Did finally work W6 on phone. My state total is now 41 confirmed. Worked a couple of

new countries, VP9 and CÖ. Missed the FM7 the East Coast boys worked. Have been having a ball on s.s.b. and one of my longest contacts of the year was on 2 way s.s.b. with WØCUC/VE4 at Churchill. Also worked VO2 for a new prefix. It still looks as though I'll be leaving here this fall or winter and am trying to get 500 counties confirmed. Need about 125 more. Not much chance!" (Afraid you're right, Hal.)

"I finally have my 32 elements on 144 Mc. in the air. It took a month to get it here by air freight from New York. I haven't worked anyone yet, but am keeping skeds as much as work allows every hour on the hour from 2300 to 0200 GMT. Frequency is 144.450 Mc. I'll be getting the antenna higher and am going to change the feedline from RG8 to RG17. I took some gear over to Nassau and things are looking up. Am going to try to borrow some 144-Mc. gear to be used in Nassau for the September VHF Contest. They have a 300' high location, but no gear. I'm also hoping to get on 420 Mc. before I leave. Have ordered some 420-Mc. receiver cavities and found a couple of 7077's to use." Thanks Hal, nice to hear again.

From Winnipeg, Manitoba, VE4GI sez that conditions have been poor on six this year with only a few small openings. He also tells us that VE4JX reports reception of KØGQG's two meter signal at 0200Z on July 29 (425 miles). VE4GI would like to try some meteor skeds on s.s.b. He's convinced it would be a cinch. Any takers? K9PQR and WA5DPC will be operating on six and two meters and looking for U. S. contacts. They'll be on 144.1 Mc. at 0300Z and 50–50.5 Mc. at unstated time. KH6FLN writes that he will be rock bound on 50.7 Mc. for a while and is looking for contacts in Hawaii or elsewhere.

50 Mc.

"The six meter boys ought to operate more c.w., for DX it's much better working c.w. than fighting all the QRM from the a.m. and s.s.b boys." So sez Harry, K1PLR. W52OMU observed openings on 8 days during July during which he worked seven states plus VE1ADF, VE1OW and K9TQR/VO2 in Labrador. WB2JCP comments that July was pretty much dead as far as openings go, but that ground wave was predominant toward the end of the month. WA2VYN, WN2KLD and WB2GKF, also of New Jersey, disagree with Ken. WA2VYN tells of working Kentucky, Alabama and North Carolina on the 14th; WN2KLD mentions that the period from July 22 to 28 was good with 4 land heard nearly every day and the last part of the month very good; WB2GKF sez very good band openings on July 10–15 when he worked Kansas with 30 over 9 signals. July was really a good month for WADRP, who observed openings on thirteen days of the month and worked twenty states, six of which were new ones for him. He also worked VE2NI on the 11th for his first Canadian contact on 50 Mc. WB2MLK/2 sez: "Summer skip is in!", and includes VE1IB among the stations heard.

WB2IPX noted long distance ground wave with 1's, 8's and VE3's coming in on July 24. At Baltimore, K3MDL comments that six meters was open in all directions several evenings during the month with the far west being heard and also hints of South America. At Anniston, Alabama, both K4FPT and W4UAR report on 50 Mc. K4FPT sez: "Most of the activity has been local with one notable exception. K4CFF has been holding daily skeds for nearly three weeks with K4WKB in Tennessee (250 miles) and the signals have been consistently good with levels from barely readable to 3 S units over the noise. *E* openings came hot and heavy for the usual summer period but have now slacked off with the only openings of late being for a few minutes to New England on August 1 and to Florida on August 8." Joe has been working on gear this summer and is about ready to hit six and two meters with new stations. He's looking for skeds out of Alabama on both bands for after September 1. Drop him a card if interested. W4UAR comments that activity is good, skip worked was into 1, 2, 3 and 8 lands, and his best DX for the month was VE2NI on the 10th. K4SFH noted openings on 7 days during July.

From Wewoka, Oklahoma, and K5VKJ we hear that six has been exciting for him this season with May and June being most active. Best contacts were into California, Michigan, Arizona, and Ohio. New ones for Bob were Kansas, Alabama, New Jersey, Utah, Maryland, Florida and Connecticut. Seven openings were observed by W6IEY, with stations in Oklahoma, Texas, Washington and Oregon being heard. K6JC tells us that Sporadic *E* has been poorer than last year. Fewer openings, especially double hop, and the openings that did occur were more brief. However, Jim did work four new states on s.s.b. and brought his total via s.s.b. up to 26. He also sez that W6NLZ and K7AAD still keep going with their scatter skeds on Saturday and Sunday mornings about 8:00 A.M. Regular 'scatterers" are: K7AAD, K7CAZ, K7DTH, W7WVE, WB6KAP, K6JC, WA6MGZ, K6HCP, K6QJB, K6SDZ and W6NLZ. At Gladstone, Oregon, "conditions have been generally disappointing" sez K7GWE. However, he did note good tropo on July 5 when he worked several stations in the Seattle area for the first time, and also worked into California, Michigan, Illinois and Texas.

K7ICW, observes that conditions for sporadic *E* quite noticeably deteriorated from the same period last year. The length, duration and intensity of the openings were definitely poorer. "No short skip under 500 miles, no *EE* over 2000 miles, no triple hop, poorer *E* backscatter. However, single hop paths were lengthened considerably, greater time and frequency of double hop openings to 4 area and noticeable *EE* backscatter with no E_s apparently present, and an increase of M/S signals on the north/south paths." At Kalamazoo, Michigan, W8CVQ noted openings on almost every day during July although they became fewer toward the end of the month. WA8HYR of Jackson tells of 1's, 2's, 3's, 4's and 5's being heard during six different openings.

We've received word that K3LNH/9 has recently retired to an island in northern Wisconsin in Lake Superior and that he has a hard time raising anyone on 50 Mc. He'll be operating 51.150 Mc. every night at 2100 CDT on s.s.b., listening for calls. K9DBR and K9DGY, both of Wisconsin, caught 11 and 12 (respectively) days of 50-Mc. openings during July. Most of the states east of the Mississippi were heard but Texas, New Mexico, Arizona, Iowa and Puerto Rico also showed at times. At Des Moines, WAØBRU notes working W5MGL, K5LBR, WA2SPL, VE2NI, K3WMJ, W7AYH, WA4QCX and K3MOQ during the month. KØFKJ, at Dell Rapids, South Dakota, worked Vermont and Massachusetts to bring his total to 41 confirmed!

KØCER has one of those interesting and odd 50-Mc. stories to tell: "This all began at 0300 GMT June 22 on 50.113 Mc. At this time I had a sked with WØWKB who is 210 miles southeast of

(Continued on page 172)

Correspondence From Members-

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

ON GOVERNING

¶ After reading W5KR's criticisms of comparisons between the League's board of directors and the Congress of the United States, I begin to wonder if W5KR has ever actually seen the Congress in session.

During a recent stay in Washington I had the opportunity to visit the Capitol and to try to see what the Congress is doing "while it is doing it." The day that I was present, however, the Senate was debating the Civil Rights Bill in closed session: in short, in a closed room where no eavesdropper may approach. Sounds strangely familiar.

I was allowed to view the House, which was meeting "in open forum." The speakers, which appeared mildly interesting to me, evidently were discussing material which was old stuff to most of the representatives at the session. Some twenty-five or thirty distinguished-looking men reading what appeared from my position to be old comic books presented a sight which could easily cause someone not too sure of the merits of democracy to turn away from it entirely. Incidentally, visitors are not allowed to take photographs.

The picture one receives from a visit to the House is misleading, of course. Any student of government will tell you that most of the work of Congress is carried out in committees, in most cases closed committees.

I would not trade the system of government in the United States for that of any dictator in the world. Neither would I choose "the man who will do what the majority want" to a board of directors who represent the minority as well as the majority. — *K3PBU*

MORE ON INCENTIVES

¶ Here's one more vote in favor of the incentive licensing proposal. I'm thoroughly disgusted with this new breed of ham who thinks that an active bank account rather than an active mind is the key qualification for a ham. It's bad enough that he doesn't *know* what's inside that mechanical marvel of his. Far worse is the fact he doesn't *care*.

Modern, sophisticated techniques are fine. And for that matter, so is the modern commercial equipment. In the hands of the "no-think" breed, though, they're just electronic noise-makers.

I studied hard for my first ticket (Class B) and I've kept up with the field. I made the push for Advanced Class, and I'll make the push for Extra Class when it becomes worth something. As a prestige item, it leaves me cold. — *K6UFW*

¶ By renewing my membership here I want the fact recognized that I definitely *do not* approve of ARRL incentive licensing proposal RM-499 and am only staying in ARRL because I feel the only way to clean up ARRL is to use my vote as a member. — *WA4BSY*

¶ I am in favor of the incentive licensing proposal to the limit. It certainly isn't the perfect answer to the lack of technical knowledge on our bands, but it's the best anyone has come up with so far so until something better comes along I'll back it to the hilt. — *WB2CPV*

¶ When my membership came up for renewal last December, I let it drop because I personally was tired of reading about all the controversy brought about due to ARRL proposal RM-499.

However, the last couple of months I have been picking up other radio magazines and the way the ARRL has been attacked by one *nut* in particular infuriated me.

Although I don't always agree with the League's policy, I would like to pick up my membership again. I wouldn't like to see anything affect an organization that has been of so much personal help to me over the years. — *W4OVR*

¶ Just a short note to let you know that I appreciate what you are doing to strengthen Amateur radio. Technical proficiency got the amateur where he is today — your stand on incentive licensing and your continued publication of *QST* and the *Handbook* are evidences of your conscientious concern with the future of our hobby. — *K9LAV*

¶ About your incentive licensing proposal — I'm 100% for it. I at present am a Conditional license, too, and as soon as I have been a ham long enough to take the examination I plan to get an Advanced or better license, even though I probably work 95% c.w.

If this proposal eliminates poor operators — or better yet causes them to increase their knowledge of electronics and operating procedure and c.w. — it will be like increasing the price on a receiver *with* new improvements. It'll cost more in the beginning but be *worth* the difference! — *W1ØHXR*

¶ Although I may not support all of the policies of the League, I will continue to support the League itself. United we shall stand. — *K7PUV*

¶ Heartily support your incentive licensing plans — amateur radio needs to be upgraded. — *W7MMI*

¶ Don't relax on incentive licensing. There are a lot of hams who are in favor, but would not bother to take time to indicate their feelings. I guess the radicals always yell the loudest. — *WB2LZJ*

¶ The more the antis talk the surer I am the League is right with RM-499. — *W1ØDSE*

¶ As an amateur continuously licensed and active for thirty years, I want to take this opportunity to state that I am in complete agreement with your policies regarding incentive licensing. I congratulate on your fortitude in taking this stand. — *W5PCA*

¶ Renewal of my membership does not indicate my agreement with the Board of Directors in regard to the incentive licensing proposal.

I have held an amateur license for almost thirty years, most of them as Class A or Advanced, and have been a member of ARRL for many years. Over the years I have supported ARRL in the belief that it was the "mouth piece" for Ham Radio, and as such represented American radio amateurs in both national and international matters. While there is very little question that ham radio needs cleaning up I don't feel the present proposal is the ultimate solution, as the directors would have us believe. The arbitrary action of the directors in ramrodding the proposal through has the familiar smell of dictatorship wherein one person or a very few determine what is best for all without any regard for, or discussion with, the wishes of those concerned.

The Board of Directors is elected by the membership, supposedly to carry out the wishes of the membership in the advancement and protection of Amateur Radio. It appears that the directors, like politicians, upon assuming office take the attitude that voters are stupid and don't know what is best for them and proceed to do as they very well please.

I am renewing on the basis of what ARRL has done in the past for ham radio. I hope that others will do likewise, and will express their opinion. I hope that the Board of Directors will reconsider its arbitrary and hasty action and in the future will carry out the will of the majority rather than that of the select few.

Should their attitude remain unchanged, I will not renew again upon expiration of my membership since it will be a foregone conclusion that, having had their way in this matter, without polling the membership, they will ignore the members in future actions. — *K6VEZ*

¶ I believe in the so-called incentive program. I have moved up from Conditional to General and am working on my Extra Class. It is not easy after you pass fifty! — *K4SBV*

¶ I am proud to enclose my renewal subscription to *QST* and membership in the ARRL. To me this is the biggest $5.00 value that any amateur, anywhere, can hope to obtain. Without the ARRL and the many members, directors, and officers who have worked to make it what it is, and what it stands for, we would not enjoy amateur radio as we do today in this country.

I am 100% in favor of the incentive licensing program. We have to do something to improve amateur operating and techniques. I think the incentive program is a step in the right direction. — *K4LFV*

¶ I did not expect to renew but Gil Crossley gave our amateur radio club such a convincing lecture on the ARRL policy that I now have no reason for not renewing. You people should publish your ideas in plain hard-hitting language instead of trying not to hurt other people's feelings — *K3TYE*

¶ I read with interest the correspondence column every month in *QST*. It amuses me to read the letters from the fatheads who don't take time to find out about an issue and think about it a while. As far as I am concerned, you people are doing a good job for me, which I could not do alone. — *K7PSS*

¶ I have a General ticket and was at first against RM-499. But since I have read about it, and have learned what it is really all about, I am for it 100%. — *K7GWE*

¶ I consider your stand (and it took such courage and thought on the part of our ARRL officers!) by our organization an intelligent move to strengthen our very shaky hold on the amateur segments of an overcrowded spectrum; and to attempt to bring our operators up to a level a bit farther removed from those on the citizens bands.

I am sure that almost all our members will find the new exam well within their ability, that they will be the better for it, both individually and collectively, and will be mighty proud of the new ticket — *W6WLQ*

¶ I just received my first license (Technician) and I would like to thank the ARRL for the publications which made it possible. Before I took my FCC exam, I was against the incentive licensing, but that test wasn't very hard and I hope to get a higher class license within a year. I can't imagine any amateur who would want his abilities to be represented by what is required to pass the General Class exam. — *WB2OYP*

MORE ON DXCC

¶ Let me answer W1FH who suggests that DXCC be scrapped because some have approached the maximum possible score.

You don't abolish mountaineering just because Everest has been climbed. There are thousands of us still relishing the struggle up the middle slopes. Those at the summit, if they are now restless, should find some other peak to conquer. — *G2RO*

¶ W1FH's suggestion is not a bad one because under the present system (1) old timers do not receive any deference for seniority or for countries once legitimate (2) new-comers cannot obtain stickers as easily because the old countries do not exist, though for DXCC purposes they could still be countable and (3) the Honor Roll is so big it doesn't mean anything, just like the 40-Zone WAZ instead of, say, a 100-Zone WAZ. W1FH's idea would give many a chance to get out of the rat-race and enjoy the hobby without the obsessive-compulsive striving to have more countries at any price. — *K4RJN*

MICRO-POWER

¶ In connection with your proposal to improve operating practices I would like to add this.

As I'm sure you all know FCC regs state that hams should use only the power necessary for the communication. Well, that sure isn't much. On 80 meter c.w. W2UUV Fishkill, N.Y. uses 160 milliwatts and has QSOed 31 states including California, Idaho, and Kansas. He has also worked into KZ5 land. The most miles per watt was with W2BNA (205 miles): the power was *67 micro-watts!*

When I go up on 20 meters. I feel sick listening to the kilowatt stations rattling off CQ DX on top of some rare DX.

My gripe isn't with the kw boys that have provision for QRP; they're perfectly legal. If they have the time, space, and money for 1000 watts, fine. But they should only use it when necessary, which is very seldom.

What would improve our bands most is improvements in the receiver and antenna instead of more kilowatts — *WB2HBI*

ON FIELD DAY

¶ Field Day stirs a lot of hams into action and provides plenty of contacts on some of our less-used bands, like ten meters for instance. However it also

(*Continued on page 162*)

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.

Try Your Hand at Some Traffic. All the recent discussions in our amateur service point to the desirability of having every licensee ready and *capable to communicate* in the best traditions of the amateur, come any disaster or emergency opportunity, or in every day service through amateur communication. In line with this we urge the slogan "everyone handle some traffic."

How to do this? Find out about your section net(s), the frequency and time of operation. You should find such information in ARRL's Net Directory. If not there, then one consults station activities reports in *QST* or his SCM, RM or PAM. You can snoop on the nets to see how they operate. But we suggest you go beyond the listening by putting together a message to a friend or someone on the net. Then await the net call to all comers and report with QTC 1. See the League's booklet if you need to brush up on message form data on message count, etc. You are cordially invited to report your activity and any traffic points each month to the ARRL SCM (address page 6, *QST*). We'll send you two or three Form 1 reporting cards to facilitate this should we get any amateur radiograms from you indicating that you would like to have same. Good procedure, accuracy, knowledge of net patterns and know-how on how to work in emergencies is developed in the main **only** by experience, and you quickly get the hang of it and will find it a pleasurable experience.

There's a high sense of accomplishment in reporting in and doing something concrete in just the right fashion. You quickly become one of a dedicated group. One doesn't have to be bashful about reporting in. The traditional latch string is out. In net operations all who hear the net call are welcome to report in, *doubly* welcome if with traffic (QTC). Give it a try and enter the ranks of those who can uphold the amateur tradition for public service in creditable fashion.

Wanted — Official Observers. With this fall season and a bigger than ever amateur radio, there's a bigger job than usual facing ARRL OOs. This is their task of trying to keep unsuspecting hams with signal troubles informed about these conditions so they can avoid possible FCC notices! If you are equipped and sufficiently experienced to help in assisting other operators through the ARRL OO program, please drop a line to your SCM and ask about OO work. Get the CD-45 application forms today.

More v.h.f. observers, 2- 6- and 10-meter workers are needed, also some equipped for RTTY and some for h.f. bands, and to watch the harmonic shadows of all our amateur bands for possible radiations that might be bothersome to other services. These same Observers also from time to time use our form CD-36, identifying signals from non-amateur sources that plague amateurs to the League, so ARRL can protest the presence of unauthorized stations that clobber amateur work! Our *Operating Booklet* explains that there are four classifications of OO work — phone observing, c.w. observing and in the frequency measuring OO capability two degrees of precision. These latter require demonstrated capability in W1AW frequency measuring tests before SCM appointment.

All amateurs helped have a right to the best amateur experience, so it is required of prospective OOs that *four years* licensed amateur experience be pre-requisite to SCM appointment. An FCC General Class ticket or higher (in Canada the DOT-equivalent) is required. As SCMs send the notices of appointment to Hq. new observers get our "standing information" to guide them, also a supply of the postage-paid forms for notification work. From time to time there are bulletins issued to observers concerning FMTs and the special problems placed before the observer system for attention. If you feel qualified won't you look into this and ask your SCM about OO appointment?

This will give you an idea of the *volume* of FD logs to process in time for the December (we hope) QST report. Contest-checking aide K1MYQ doesn't always look so happy at that prospect. (Guess what happened to that stack when Chet got up!)

DX on 160 . . . in the '64 Contest. Operation on 160 meters can pay big dividends, and it's time to plan some simple gear for this band to get in on the top band opportunities in the coming months. Nets who have members with stand-by 160 provisions will be able to beat "Old Man skip" in those coming winter-night conditions. But with the equipment in readiness you can have other thrills and records too. This month *QST* carries the report on ARRL's '64 DX Competition. It speaks for itself! But lest the 160-meter DX go unnoticed, look at the following:

11 Countries W1BU; *10 Countries* W1BB; *4 Countries* W2EQS; *3 Countries* W3s GRF MSK, W4KXV, K5HRR; *2 Countries* W1TX, W4-BVV, W6RW; *1 Country* W2GGE, W4DXI and W8FGX.

Official Observer Honor Roll. The annual report of the Communications Manager to the Board notes that Observers sent-and-reported 21,367 cooperative-notices last year. The top three OOs were W9VSO 1330, W3NNC 1213 and W8EMD with 1061 notices. The prestige of the amateur service is raised, as well as operating conditions bettered for all amateurs by this activity in self-monitoring of our own service. Thanks and congratulations to the 264 different OOs who reported on such a volume of activity. Most of the responses make a growing (and glowing) tribute. The mission of OO's is to *help hams avoid FCC trouble*. The League forms for reporting signal discrepancies enable you and me to look into our own set-up and improve adjustments if called for. Here's the Honor Roll which shows the Observer call area leaders as well as extends our special commendation to those forwarding over 300 notices.

Honor Roll

Call Area Leaders	Above the 300-Notice Mark
W1FZJ W2TPJ W3NNC	W9VSO W3NNC W8EMD
K4IWI W5FFW WA6RXM	W2TPJ K8RFU W2BLP
W7HDL W8EMD W9VSO	W8VPC W9NPC K4IWI
WØPFG	W3BFF W9GFF K3INP
	WØPFG K9GDF KØTDO
	W1FZJ W5FFW W1JNV
	WA6RXM

—*F. E. H.*

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.

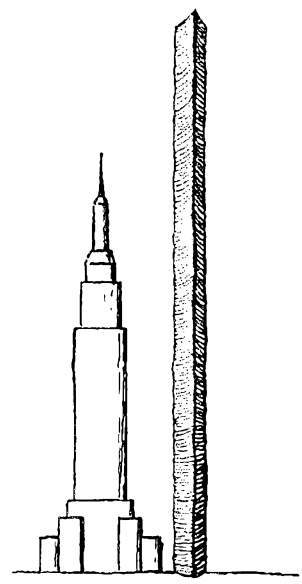
You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

—*F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
West Indies	Oct. 9, 1964	M. F. Nelson	Aug. 10, 1963
Alaska	Oct. 9, 1964	Kenneth E. Koestler	Apr. 10, 1964
Mississippi	Oct. 9, 1964	S. H. Hairston	Sept. 27, 1964
Delaware	Oct. 9, 1964	M. F. Nelson	Dec. 10, 1964
Southern Texas	Oct. 9, 1964	Roy K. Eggleston	Dec. 10, 1964
Maryland-District of Columbia	Oct. 9, 1964	Andrew H. Abraham	Dec. 10, 1964
Alabama	Oct. 9, 1964	William S. Crafts	Dec. 26, 1964
San Francisco	Oct. 9, 1964	C. Arthur Messineo	Resigned
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

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections,



In an infrequent idle moment, DXCC aide K1CEC calculated the height of the number of cards that have been processed for DXCC credit, post-war. Approximately one and a quarter million cards have received individual scrutiny before being approved. This represents a stack of QSL's around 1570 feet tall, roughly 25% taller than the Empire State Building!

completing their election in accordance with regular League *policy, each term of office* starting on the date given.

Louisiana	J. Allen Swanson, Jr., W5PM	June 10, 1964
Utah	Marvin C. Zitting, W7MIWR/W7OAD	July 15, 1964
Western Pennsylvania	John F. Wojtkiewicz, W3GJY	Aug. 7, 1964
Santa Barbara	Cecil D. Hinson, WA6OKN	Aug. 10, 1964
Western New York	Charles T. Hansen, K2HUK	Aug. 10, 1964
Ontario	Richard W. Roberts, VE3NG	Aug. 20, 1964
San Joaquin Valley	Ralph Saroyan, W6JPU	Aug. 20, 1964
Northern Texas	L. L. Harbin, W5BNG	Sept. 12, 1964
Santa Clara Valley	Jean A. Gmelin, W6ZRJ	Oct. 15, 1964
Kansas	C. Leland Cheney, WØALA	Oct. 29, 1964

JULY CD PARTIES

Just look at the following list and you'll see why the July CD Parties sounded so active! Last year the July c.w. affair had just 28 topping the 100-K mark while 49 made it this year; this year 27 topped the minimum figure for phone *vs.* 14 in '63. At K1WJD's urging, W1JYH returned to the fray for a 15½ c.w. hour performance *par excellence*. At a future date we hope to picture Roger either here or in a *CD Bulletin*. The July party seemed characterized by the prevalence of short skip. Section multipliers were down but QSO figures up allowing many contesters to raise totals impressively. Contrast was the order of the day: easy sections (W. Fla. and W. Mass.) were scarce, Arizona and other 7's plentiful. For the first time in a long time 15-meter activity proved rewarding. This coming October let's shoot for more long-haul section activity (K1I6, KZ5, Sask.) — the following are high-claimed scores, number of QSOs and sections with final results to appear in the *October CD Bulletin* — *W1YYM*

C.W.

W1JYH	224,280-705-63
K1WJD	211,575-644-65
W9EWC[1]	194,670-614-63
K4PUZ	193,965-575-67
K3MNT/3	188,100-565-66
WA8ENO	175,560-526-66
K8MTI	174,850-531-65
K4ZRA	174,080-538-64
K2KTK	171,045-536-63
K1LPL	170,190-542-62
W2ZRC[2]	169,470-531-63
K9DHN	168,525-530-63
W9LNQ	159,340-509-62
K4BAI	158,445-496-63
WA2WLN	156,465-506-61
K1YKT	142,290-459-62
K5OCX	142,290-453-62
K8RDE	141,120-435-64
K1IFJ	137,020-436-62
WA9AUM	136,880-458-59
W4YAU	129,289-399-64
WØETT	129,280-400-64
W1ECH	128,100-420-60
WA2YLL	128,100-416-61
WA2KQK[3]	122,695-410-59
WA2UOO	120,840-424-57
K3YQJ	120,840-419-57
K1EWL	120,065-400-59
W2ZVW	118,900-403-58
WA5CBL	117,440-360-64
WA8DNZ	115,425-405-57
K4ITV	113,680-387-58
W4MXU	112,200-367-60
K1ZND	110,880-390-56
WA4SHD	110,330-369-59
K4RIN/4	108,750-371-58
WØMAK	108,000-353-60
KØAZJ	106,590-370-57
WA2PJL	106,500-349-60
K2QDT	106,020-372-57
K1ZHS	105,560-401-52
WA1ALZ	104,310-360-57
K3QDD	104,310-336-61
K3HNP	102,600-356-57
WA4HRG	102,000- 36-60
K1NBN	101,200-368-55
W4KFC	101,110-342-58
K4VFY/4	100,440-318-62
W1AW[4]	100,170-371-53
WA4IUM	100,005-334-59

PHONE

K3MNT/3	22,610-128-34
K9DHN	18,880-113-32
W1FJJ	17,400-110-30
K2EIU/5	14,105- 85-31
K8RDE	13,300- 89-30
W2ZVW	12,750- 78-30
K1ONW/1	11,060- 74-28
K9MAN	9315- 69-27
K4BAI	8820- 77-21
WA2SMP	8505- 63-27
K8RFU	8040- 62-24
WA2YLL	7820- 64-23
K9MAF	7820- 64-23
K1ZHS	7590- 61-23
WA9BWY	7560- 60-24
W4MXU	7480- 61-22
WA2UOO	7350- 67-21
K3RFH	7280- 56-26
W1AW[4]	7150- 48-26
W1JYH	7035- 60-21
W3HC	6300- 58-20
K4ZRA	6160- 53-22
W3HKS	6120- 15-24
W3NOH	5850- 45-26
K5TYW	5750- 45-23
K3QDD	5600- 50-20
K5MDX	5060- 44-23

[1] K9WIE, opr. [2] K2SIL, opr. [3] K2SSX, opr. [4] W1WPR, opr.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPL	87	3748	3616	132	7583
W3CUL	201	1908	1531	362	4002
KØONK	194	833	758	54	1839
WØBDR	56	839	804	35	1734
W6WPF	87	602	507	65	1261
WA9CCP	50	566	530	35	1181
WØLGG	64	562	494	35	1155
W1PEN	61	555	494	41	1151
WA2RUE	44	529	497	26	1096
W3VR	44	477	464	6	991
WB6JUH	173	369	335	32	909
W7BA	8	449	389	50	896
W6RSY	26	383	256	120	785
K9KZB	14	365	354	11	744
W7DZX	11	389	337	4	741
W3EML	25	385	283	9	702
W8UPH	6	335	290	45	676
K9IYG	74	303	244	5	626
K6IWV	4	298	287	11	600
K6MIDO	9	296	282	14	592
WA4IMC	108	239	224	15	586
WA9AUM	17	268	258	2	545
K9DHN	18	277	244	4	543
WA2GPT	78	234	195	23	530
K4PXY	102	203	102	98	505

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6YDK	2880	1011	970	41	4902
W6IAB	854	1877	1456	421	4608
KR6GF	1364	46	29	46	1485
KR6MD	17	313	312	1	643

BPL for 100 or more *originations-plus-deliveries*

K1PGQ 143

W4RHA 212	W2EW 139	W8DAE 106
W7APS 173	K7SGX 129	W9JDF 102
WA6TAW 159	K9IMR 124	W9NZZ 102
WB6GZY 153	WA8KUW 111	W5DTA 100
WA4BMC 150	WA8EIC 108	Late report:
K6GZ 148	WA0EMX 108	W1LES 106 (June)

More-Than-One-Operator Station

K2U8 103

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: K2SJN, WA4HRG, WA4IMC.

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.

A.R.R.L. ACTIVITIES CALENDAR

(*Dates shown are per GMT*)

Oct. 1: CP Qualifying Run — W6OWP
Oct. 3–4: Simulated Emergency Test
Oct. 10–12: CD Party (c.w.)
Oct. 15: CP Qualifying Run — W1AW
Oct. 17–19: CD Party (phone)
Nov. 6: CP Qualifying Run — W6OWP
Nov. 20: CP Qualifying Run — W1AW
Nov. 15: Sweepstakes Contest (phone)
Nov. 22: Sweepstakes Contest (c.w.)

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Oct. 3–4, 10–11: VK/ZL Oceania DX Contest, W1A-NZART (p. 92, last month).

Oct. 3–5: Ninth Delaware QSO Party, Delaware ARC (p. 110, this issue).

Oct. 10–11, 17–18: VU2/457 Contest, Amateur Radio Society of India (p. 94, this month).

Oct. 17–19: Fourth World-Wide RTTY Sweepstakes, RTTY, Inc. (p. 63, this issue).

Oct. 19–20, Nov. 2–3: R.S.G.B. 7 Mc. DX Contest (p. 90, this issue).

Oct. 21–22: 25th YLRL Anniversary Party, c.w. YLRL (p. 97, this issue).

Oct. 31–Nov. 1: New Hampshire QSO Party, Concord Brasspounders (p. 132, this issue).

Nov. 4–5: 25th YLRL Anniversary Party, phone, YLRL (p. 97, this issue).

31st ARRL Sweepstakes — Nov. 15 (phone) and 22 (c. w.)

Next month *QST* will have the complete announcement of our domestic Sweepstakes Contest. This early announcement is for the benefit of amateurs in remote ARRL sections who will not have received the next issue before Sweepstakes. Refer to November 1963 *QST* for general contest details. This year the phone and c.w. portions will be held on two separate weekends. Each period will start at 2400 GMT Saturday night and run till 2400 GMT Sunday night, no time limitation within that period. Here's the chance for the savvy OT to put his know-how to work in making the right bands pay off at the right times for QSOs! Without jeopardizing either score the versatile SSer can now compete fully in *both* modes.

If you are anywhere in the League's field-organizational territory (see page 6, this *QST*) you are urged to take part in this popular contest activity. Although not an ARRL section, Yukon-N. W. T. (VE8) counts as a separate multiplier in the contest. There are two separate contests, phone and c.w. The total operating time allowed each contestant in either contest is 24 hours. There are section awards, club awards, and special Novice awards as well.

Contest reporting forms will be sent free to anyone requesting them by mail or radiogram. *Get your requests in early.* Check the full details in next month's issue of *QST*. Good luck.

W1AW SCHEDULES

(October, 1964)

Operating Hours

Daily: 2230 to 0430 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. EDST Monday through Friday. On October 25, W1AW will switch to its winter schedule, which will appear in November *QST*.

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., 0000; Tues. through Sun. 0400.

Voice: Mon. through Sat. 0100; Tues. through Sun., 0330.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

SUGGESTED

OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Hawaiian −10, Central Alaska −10.

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 Oct. 15 at 0130 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 Oct. 1 at 0400 Greenwich Mean Time on 3590 and 7219 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, 0130 GMT Oct. 15 becomes 2130 EDST Oct. 14.

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. These start at 2330 and 0130 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 0130–0220; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0130–0220; 10, 13 and 15 w.p.m. daily from 2330–2440 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130–0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist 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 0130–0220 GMT practice on those dates:

Date	Subject of Practice Text from August *QST*
Oct. 5:	*It Seems to Us . . . .*, p. 9
Oct. 8:	*A Transistor C.W. Station for 7 Mc.*, p. 11
Oct. 13:	*Using the OSCAR III V.H.F. Communication Satellite*, p. 17
Oct. 21:	*Help a Ham*, p. 22
Date	Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Oct. 26:	*Resistive Impedance*, p. 24
Oct. 30:	*Q-The Shorthand Number*, p. 24

W1AW NOTE

The ARRL Headquarters Station, W1AW, has been undergoing extensive reconstruction. Operation during this period (2230 to 0430 GMT daily) will be conducted from temporary positions in the basement of the building on a curtailed schedule on 80, 40 and 20 meters only. Full W1AW services will be continued for the transmission of voice and c.w. bulletins, as well as both periods of tape-sent code practice, as noted elsewhere on this page. During most of this period, with the building in disarray as construction progresses, it will not be feasible to invite visitors.

We hope you will bear with us in these slight but necessary inconveniences with the expectation of renewed and extended complete schedules when the changes are completed, from a rebuilt and better W1AW.

DX CENTURY CLUB AWARDS

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 of receipt. All totals shown represent submissions credited through July 31, 1964.

W1FH....311/337
CX2CO....311/332
W9RBI....311/336
W6CUQ....311/336
W8BRA....311/336
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
WØQVZ....309/330
G3FKM....309/326
W3JNN....309/333
DJ1BZ....309/327
W4QCW....309/326
W9HUZ....309/329
W8EWS....309/333
W5MMK....309/330
K3UPG....309/333
W8JBI....309/328
DL3LL....309/325
WØDU....309/331
CE3AG....309/333
W3KT....309/333
W8KML....308/329
W1JYH....308/331

W6YY....308/328
W2BOK....308/325
W7GBW....308/332
W4TM....308/330
W2ZX....308/326
WØAIW....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
HB9J....307/331
W6AM....307/332
W5ABY....307/324
W2ZGB....307/323
WØBFB....307/325
OE1ER....307/329
K2BZT....307/324
WØELA....307/330
W2SUC....307/324
W3JTC....307/330

W8HGW....306/331
WØQDF....306/323
G8KS....306/324
W7ENW....306/330
W2UVE....306/324
W5CKY....306/325
W8DAW....306/329
W2WZ....305/328
WØSYK....305/323
W1ZW....305/322
W2OKM....305/323
K6ENX....305/322
W2FXN....305/319
W4LYV....305/325
K4LNM....305/319
W3EGR....305/322
K2GFQ....304/325
W5ADZ....304/326
W6CYV....304/322
W4MR....304/324
W9AMU....304/321
W2GUM....304/326
W7AC....304/328
W4OPM....304/319
WØNTA....304/324
W1HZ....304/322
W4GXB....304/325

W2AYJ....304/323
W2TVR....304/322
G3YF....304/326
W5AFX....304/329
W2HMJ....304/324
W2LAX....304/321
K6FVR....304/321
W5ASG....303/327
W4VPD....303/320
W2SAW....303/320
W5UX....303/318
W8PUD....303/320
W9KOK....303/327
W8IRN....303/321
PAØFX....303/323
DJ2RW....302/319
K4RID....302/316
WØPGI....302/317
W4PLL....302/317
W3WGH....302/317
W8NGO....302/319
W4OM....302/324
5Z4AQ....302/320
I1AMU....302/321
W5QLG....302/323
W9GIL....302/319

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
W8PQQ....308/329

W8KML....308/329
W2ZX....308/327
5Z4ERR....308/330
W4DQH....308/330
PY4TK....307/324
W6YY....307/327

W3JNN....307/328
W2JT....306/320
W2BXA....305/327
W9JJF....304/321
WØAIW....304/325

W8HGW....302/324
W4QCW....302/315
W6AM....301/325
I1AMU....301/320
TI2HP....301/323

New Members

From July 1, through July 31, 1964 DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below:

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VK3AHQ....238
SM6VR....169
KØTRG....153
PAØMDG....143
DM2AND..131

PAØQT....127
W4VMS....122
PAØBRS....116
VQ8AM....115
HI8ZE....113
W8SH....112
W3KGU....110

VE1PB....110
WØMVG....109
WA2TOA....105
W6BCT....105
K9PE1....104
8P8ABQ....103
W1GUC....102

K1PNS....102
K2AFY....102
W4CZ....102
K9VLE....102
VE7AC....102
DJ2OV....102
LU9WA....102

OK2BAT....102
YU3TT....102
K1VSK....101
W5HTM....101
OH3XQ....101
SM6BGJ....101
WB2RAL....100

K2MPS....100
W3HNK....100
WA6SLU....100
K8WOU....100
K9WIE....100
HB9AAG....100

Radiotelephone

DL3AA....161
KØTRG....150

PAØLOU....134
I1IGAI....128
OA4OS....124

ZL2UW....118
WA2IEK....114
9Q5AB....113

TI8AC....109
W2RHX....107
I1NE....105

EP2AU....103
XE2WH....103
WB2CCO....101

WA4KLT....100
WA6MWG..100

Endorsements

VE2WW....312
W5HDS....311
DL6EN....311
W3OF....310
W6BSY....306
W3MFW....300
PAØLOU....300
ZP5CF....300
W9MQK....298
W8ZCQ....295
W1WDD....292
VE3ES....291
W1TYQ....290
W4BBR....290
W8PHZ....290
WØMCX....290
DL1KB....289
WØAIH....285
W1MQV....284

WA2ELS....281
W6SIA....273
HB9EO....273
K1SHN....270
W4NJF....270
ZP5ET....265
W6AFI....262
W4THZ....261
W6PHF....261
W3INH....260
K8IKB....260
W2DXX....252
W8CQ....252
K2YXY....250
W4QVJ....250
K4SCT....250
W1BPW....244
ZB1CR....242
DL7AH....241

K6JIC....240
W3KDF....233
WØCDF....233
DL9RK....233
K6CYG....231
K8DYX....228
K8VDV....225
W9NGB....225
LU5ABL....222
K4IEX....220
LA5YE....220
W8YGR....216
K9HGM....215
DL3TW....214
W1FTX....210
CR7LU....209
PAØFAB....206
DL1HH....205
OE1FT....203

W1ETF....201
G3HIW....201
W2GHK....200
K1IMP....199
W2CZF....195
W2ZTV....191
ZS1NQ....191
W6UMI....190
DJ2MN....190
G8FW....189
PAØVDV....189
9Q5AB....183
KL7DTB/6..181
ZS2RM....180
K3MNW..177
WA6OZL...176
F2PO....171
HA5BU....171
WA5CBL...170

W7JWE....170
W7DQM....168
G8ON....168
W1QAK....154
K8BCK....153
PY1BLT....152
W4PNS....151
K7ADL....151
K3CNN....150
WA4EDY....150
HA5KAG....150
VP7NQ....150
WA5CBE....149
W7NNF....143
W3ZVJ....141
W8RCM....140
W0GNX....140
WB2APG....135
W2IVS....134

K7UCH....134
CR7DQ....134
K4PXY....132
K3LJZ....130
PAØLV....130
K1EAT....127
K4CEB....125
WA6KMF..125
I1HL....124
K2DQI....122
W1CQI....120
WA2QHQ...120
DJ4XE....113
W6GSV....111
K3JZH....110
K4WMB....110
W5TEP....110
W9OKM....110
K9ZXG....110

Radiotelephone

ZP5CF....299
DL6EN....294
SM5LL....286
W6BAF....278
ZP5ET....265
W1WDD....261
W6YMV....253
W9NZM....253
WA2ELS...244

PAØSNG....241
DL1KB....233
W6BSY....230
K1SHN....221
VE3ES....220
LA5YE....220
K6ERV....212
WØMCX....211

W4SHP....202
K6CYG....201
W1ETF....200
W2GHK....182
9U5PD....182
W3LPF....181
W4NI....180
W8MXS....180

W2CZF....175
W2ZTV....175
W1BPM....171
W3BSC....171
K1JNE....170
W1KID....170
K2POA....170
OA4PD....166

W2GKZ....165
W6SIA....163
W7DQM....162
K8DYX....156
HK3AFB....154
W1MQV....153
W4PNS....151
KØTRG....150

VE3RE....146
OA4KY....140
W1LIY....137
W6TGB....129
DJ2UU....123
CO8RA....120
WA2JBV....113
WØEXU....113
KØPIE....110

• 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 Tue. on 50.4 Mc. at 2100 local time. K3LEC reports that more than 20 stations are now checking into DEPN. Kent County Arc officers for the following year are K3RUJ, pres.; K3WEE, vice-pres.: K3RUD, treas.; KN3FPC, secy. The annual club picnic was held July 26. K3YZF is enjoying traffic work with his new SB-300. K3YHR handled traffic from Rehoboth Beach during the summer. K3FPB has a new Galaxy 3 in action. K3RUD and W3IUO are new grandfathers. W3RDZ continues to do an excellent job as OO. Traffic: K3YZF 57. W3EEB 56, K3OWS 28, K3YHR/3 8, W3HKS 6, K3KAJ 2.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SAO, W3SGI. The E. of Pa. C. W. Net had 393 QNI and QTC of 274. PTTN had 142 QNI and 42 QTC. New appointments: K3RZE as ORS, K3EUE as EC for Adams County. K3HTZ visited VE3-EYC during vacation. K3YEO operated K3BSA at the Boy Scout Jamboree. K3KTH operated portable from Hyannisport, Mass., and K3YVG from Grafton County, N.H. K3KBN/3 is operating from Pine Forest Camp. K3RUA is Boy Scout radio and signaling counselor for Bucks County. K3PBU will be entering Penn. State University in September. W3MPX is now Extra Class. A new operator in the Lancaster area is WA3BHN. A new Novice is WN3BGA, the XYL of K3NOX. K3OVI entered the U.S. Air Force. K3KNL made WAS with 50 watts. K3VAX is on 6 meters with a Utica 650 and an indoor antenna. K3RFH celebrated his 25th anniversary in ham radio; his first call was W8TRX. W3CVK is now W5NMO in Oklahoma City, Okla. K3MTF has big rig troubles and now is QRP with 13 watts. New Gear Dept.: NCX-3 and NCN-2000 to W3ELI (claims no one hears him), a new 80-meter Hertz to W3AZR so the EPA Net can hear him and a new Drake 2-B receiver to K3OMP, so he can hear the net. It's time for another pep talk on late traffic reports. Those received after the 6th of the month take the chance of not making the *QST* report. All BPL listings must be confirmed via your Form 1 card mailed with your regular monthly reports. Form 1 report cards can be had gratis via radiogram or your mailed request. There have been a number of appointment cancellations because of continued inactivity and non-reporting. The following counties presently have no Emergency Coordinator: Berks, Carbon, Chester, Columbia, Cumberland, Dauphin, Lebanon, Lehigh, Luzerne, Lycoming, Montour, Northampton, Perry, Pike, Schuylkill, Snyder, Sullivan, Union, Wayne, Wyoming. Amateurs in these counties interested in traffic and emergency work are invited to apply for this appointment. Traffic: W3CUL 4002, W3VR 991, W3EML 702, K3MVO 213, K3OMP 145, K3YQJ 125, K3MYS 117, W3AZR 74, K3RUA 62, W3ELI 59, K3PBU 57, K3KTH 40, K3HNP 37, K3ZRQ 36, W3-AXA 32, K3JHF 26, K3LTI 26, W3VAP 25, K3HHY 24, W3JKX 22, K3MQE 20, K3YVG 18, K3MNT 14, W3RV 13, K3SFP 13, W3AMR 10, W3PDJ 9, W3BFF 8, K3KNL 6, W3OY 6, K3MTF 4, K3RZE 4, K3EMA 3, K3HKW 2, K3HTZ 2.

MARYLAND-DISTRICT OF COLUMBIA—Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, K3JYZ, W3ZNW, W3MCG. PAM: W3RKK. The MDD Net meets daily on 3649 kc. at 0000Z. The MDDS meets daily on 28.1 Mc. at 0130Z. The MEPN meets M-W-F at 2200Z and Sat. and Sun. at 1700Z on 3820 kc. The Foundation for Amateur Radio announced that K3OKJ was nominated for the scholarship award this year. W3AHQ will put the OBs on v.h.f. Mon. at 7:30 P.M. on 50.4 Mc. WN3AFS will be active from W2SZ this fall. WN3AJR sends in his first report. W3CDQ has been active on 20 meters. K3DCP is busy on 20-meter s.s.b. and c.w. K3DNO missed all of the 6-meter openings. W3EAX (U. of M.) will be active this fall. W3EOV operated mobile while on his vacation in New England and Northeast Canada. W4EXM/3 is taking the advanced piloting course as given by the U.S. Power Squadron for boating. W3GCO keeps busy with the activities of NC V.H.F. K3GZK is back from vacation and should have the rig back on the air. W3HQE is busy working on antennas for the winter DX. W3IWJ is living in Princeton, N.J., and expects to be there about four years. K3KMO enjoyed the picnic and meeting the MDD gang. W3MCG has been working on some audio equipment. K3LLR has some transmitter trouble. K3MDL has been holding down the weather watch during the severe storms. W3OHI has a scope that really works. W3PQ sends in a very fine list of traffic. W3QCW has been appointed MDD net manager and K3JYZ has resigned from that post. K3NCQ spent some time on active duty in New Orleans. K3OAE will remain at M.I.T. this fall. K3RUQ enjoys working on the MARS frequencies. K3SKJ has applied for ORS appointment. K3SMT broke his ankle while erecting an antenna on Field Day. K3TJE works DX along with being NCS on MDD. W3TMZ visited some ham friends in the Midwest. K3TUJ is having transmitter problems. K4-SRA/3 has retired from the Navy and has applied for

(*Continued on page 112*)

NINTH DELAWARE QSO PARTY

October 3-5

The Delaware Amateur Radio Club of Wilmington announces its 9th Delaware QSO Party and invites all amateurs to participate. Delaware hams are urged to work as many out-of-state stations as possible, so that those interested can earn credit toward WAS and the W-DEL certificate. Here are the details:

(1) Time: 30-hour period from 2200 GMT Oct. 3 to 0400 GMT Oct. 5.

(2) No time limit and no power restrictions.

(3) Scoring: *Delaware stations:* 1 point per contact and multiply total by the number of states, Canadian provinces and foreign countries worked during the contest period. *Outside stations:* 5 points for each Delaware station worked and multiply total by the number of counties in Delaware worked during the contest period.

(4) Credit for contacts with the same station on other band will be given.

(5) A certificate will be awarded to the highest-scoring station is each state, Canadian Province and foreign country (with 3 or more contacts) and to the highest-scoring station in each Delaware county. In addition, a W-DEL certificate will be sent to any station working all 3 Delaware counties. Party logs showing required data will be accepted in lieu of QSLs.

(6) *Suggested freqs:* A.m. 3825, 7225, 14,225, 21,325, 29,000 kc. C.w.: 3525, 7025, 14,025 21,025, 28,025 kc. S.s.b.: 3975, 7275, 14,325 21,425, 28,650 kc. V.h.f. 50, 50.4 and 144 Mc.

(7) General Call: "CQ DEL." Delaware c.w. stations should identify themselves by signing *de (call) DEL K.* Phones say, "Delaware calling."

(8) Contact information required: Delaware stations send number of QSO, RS(T) and county (New Castle, Kent or Sussex). All others send number of QSO, RS(T) report, and state, province, or country.

(9) Logs and scores must be postmarked not later than Oct. 31, 1964, and should be sent to the Delaware Amateur Radio Club, c/o J. E. McCarley, K3NMY, P.O. Box 201, Newark, Delaware. Applications for the W-DEL certificate should also be addressed there.

THIRTY YEARS AGO National announced the HRO receiver . . . the first of a series of equipment destined to become the standard of comparison whenever rag-chews swung around to the topic of store-bought gear. Probably the best-known receiver ever manufactured, the HRO was for many years in a class by itself because of its enormous frequency range (down to 50 Kc) and remarkable sensitivity. Only a couple of years ago the editor of *DX Magazine* commented that "All veteran, experienced DX'ers know that for supreme sensitivity and S/N ratio no other commercial receiver compares with a . . . National HRO. For pulling an AC-5 through early morning hiss it is superb . . ."

IN RECENT YEARS our sales of HRO receivers have been confined almost exclusively to laboratories and commercial concerns who require the combination of features found only in the HRO—wide frequency range with superb sensitivity, image rejection, and absence of spurious signals. Since we've been with *National*, the most frequently asked question we get at hamfests and conventions has been "When are you guys coming out with a new HRO for SSB?" . . . and we've been smiling pleasantly and providing the following explicit and comprehensive reply: "Someday." Meanwhile . . . our Advanced Development Team has been working for over three years on just such an equipment—and we apologize here and now to HRO enthusiasts for the necessity of keeping this development secret.

THE NEW HRO-500 receiver announced in our back-cover ad this month represents what is probably the most important departure from conventional receiver technology since the first HRO was announced 30 years ago. The new HRO incorporates, of course, every ounce of performance the advanced amateur expects—rock-solid stability . . . one Kc dial calibration (and with the PW dial those one Kc division are ¼" apart) . . . 6-pole steep-skirted selectivity variable from 500 cycles to 8 Kc, with *Pass-band Tuning* used for sideband selection in the 500 cycle and 2.5 Kc positions . . . of course, a superior product detector and AGC for SSB and CW . . . AGC threshold control (about which, more details in a month or so) . . . *and sensitivity and noise figure superior to any previous HRO!* The owner of an HRO-500 enjoys, in addition, two particularly important benefits never before available in any commercial grade communications receiver—total transistorization and a phase-locked frequency synthesizer to provide the almost unbelievable continuous frequency coverage of *five kilocycles* to 30 Mc . . . and with identical stability, tuning rate, and dial accuracy throughout that entire range.

THE SOLID STATE circuitry of the HRO-500 immediately assures reliability and equipment life far in excess of tube-type equipment. Estimates range from twice to ten times as great. And at 50 mw. audio output, the new HRO draws the grand total (with pilot lamps switched off) of 200 ma. from a 12 V.D.C. source, and *15 watts* from either a 115 or 230 V.A.C. line! This is a receiver that can literally go anyplace, and be powered by 12 volts worth of flashlight cells.

THE SECRET of the HRO-500's stability, dial accuracy, and wide frequency range lies in National's phase-locked Frequency Synthesizer, used for front-end oscillator injection. The 5 Kc-30 Mc. tuning range is covered in 60 500 Kc bands, with all necessary high frequency oscillator signals synthesized from the output of a single highly stable 500 Kc master crystal oscillator. (The LF-10 Preselector is an optional accessory to increase maximum usable sensitivity and overload protection in the 5 Kc-500 Kc VLF band for commercial applications). Tuning the synthesizer-controlled HRO-500 from one 500 Kc band to the next is a novel experience—assume that the '500 is tuned to the 14. 0-14.5 Mc. band. *14.0* (Mc.) appears in the horizontal synthesizer window over the main PW tuning dial, and frequency in Kc between 14.0 and 14.5 Mc. is read on the PW dial. To shift the receiver to the 14.5-15.0 Mc. band, the *Synthesizer* knob is simply rotated until 14.5 (Mc.) appears in the synthesizer window. As soon as the *Synthesizer* knob is turned, the audio output from the receiver is completely muted and the red *Phase Lock* warning lamp on the front panel flashes rapidly, indicating that the synthesizer has not yet been phase-locked to the next 500 Kc band. The *Synthesizer* knob is turned until 14.5 (Mc.) appears in the window and the *Phase-Lock* lamp extinguishes. Simultaneously, the receiver audio is unmuted and the HRO instantly awakens to responsibility.

THE HRO-500 is a far cry from 1934's model . . . gone are the tubes and the plug-in coils . . . But now as 30 years ago, when you own an HRO, you own the best.

MIKE FERBER, W1GKX

National Radio Company, Inc.

ADVERTISEMENT

(*Continued from page 110*)

a W3 call. W3YKQ, Howard County EC, is looking for AREC members so that he can arrange for a net on 6 meters. K3ZKX is trying out the 432-Mc. band. W3-ZUH has a new SSB-330 receiver. W3GLX is a Silent Key. The radar station on about 432.1 Mc. is causing plenty of QRM on that band in this area. Traffic: K3-QDD 138, W3PQ 103, K3LLV 99, W3QCW 92, K3RUQ 78, K3TJE 70, W3AHQ 54, W3HQE 35, W3EOV 28, K3-QSX 19, K3YKC 18, K3KMO 17, K3URZ 12, K3GZK 10, K3QZZ 6, K3TUJ 5, W3MCG 4, WN3AFS 2, K3LLR 1, W3ZUH 1.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: WA2BLV and WA2VAT. Jersey Phone & Traffic Net July totals: 31 sessions, QNI 603, traffic 192. W2PEV is the new asst. manager. K2PI, SJRA's *Harmonics* editor, is visiting W4IE at Sarasota, Fla. A late FD report was received from W2BX/2, located at Weymouth. W2MDD, Monroeville, is now s.s.b. on 75. W2-CKX is recovering from a broken foot. The Gloucester County ARC code class is in charge of WA2NPD. Director Crossley, W3YA, attended the Gloucester County ARC Hamfest. The SJRA held its annual White Elephant Sale at the August meeting. At the recent FD W2BQ, W2LY, K2PI and K2BG posed for a group picture of 2-letter calls. WA2ABF took the picture. SJRA's Field Day score was over 14,000 with 1720 contacts. W2HBE was FD chairman. K2JKA, *Crosstalk* editor and Gloucester County EC, spent two weeks in upstate New York as the guest of Uncle Sam. K2PQD is now on RTTY. Another vacationer, W2EZM of Maple Shade, was in VP5- and VP7-Lands. W2BZJ, Pennington, reports operators on RACES in the Trenton area are badly needed; also help is needed operating W2VQR on Sun. WA2WLN, Linwood, a fine traffic-handler, is building a 500-watt linear for net work. WA2BLV, NJN manager, reports the following totals for July: 30 sessions, QNI 681 (67 different stations), traffic 294. W2KHW, Maple Shade, is recovering from a serious illness. The Burlington County Radio Club will hold its first annual picnic at the QTH of W2RQC in Jobstown. Reports are being received very well in spite of the summer season and vacations. Traffic: (July) WA2BLV 192, W2RG 99, WA2WLN 53, W2ZVW 46, WA2-KIP 34, W2BZJ 6, W2BEI 4, WA2KAP 2. (June) WA2-BLV 121, W2ZVW 120.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PVI. 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; 1PN on 3980 kc. at 1600; 2RN on 3690 kc. at 0045 and 2345 GMT. K2LWR and W2UVE, both with 300 countries plus, are teaming up to vacation in Europe and work DX from the "other end." W2SSC has WAS. Judging by the mail just about every active club or net had a picnic this year—and a fine time was had by all. WA2ANE has taken over as Net manager of the NYSPT&E Net and K2HOH, former mgr., is chairman of the policy committee. The new Section Net certificates have been issued to all regular members of the NYS Counties Net. W2RUF is net mgr. She still needs representation from Allegheny, Cattaraugus, Cayuga, Cortland, Herkimer, Lewis, Orleans, Seneca, Steuben, Tioga, Clinton, Fulton, Jefferson, Montgomery, Schoharie, Warren and Sullivan. The net meets Sun. at 1000 on 3510 kc. and Mon. at 2000 on 3670 kc. This is one of the most vital networks we can maintain; if you have c.w. capability and live in one of those counties, contact W2RUF. WB2DMU has an SR-34 transceiver on 6 and 2. WB2ARG and WA2SMP do a good job as NCS in ECEN. WA2SMP uses an HX-20 exciter to a home-brew 500-watt linear, Drake 2B receiver, 65-ft. tower and inverted Vees for 80 and 40. WB2DPR received his 20-w.p.m. code certificate. K2DNN set his station at Boy Scout Camp Seneca and gave a talk and AREC demonstration to the scouts. He had base stations alerted. This was done on two occasions and 25 messages were handled back to parents. Appointment: WA2NXZ as OES. Endorsements: W2EMW and W2-QHQ as ORSs. Every appointee is reminded that he is expected to report his activities monthly to the SCM. Traffic: (July) W2OE 325. W2GVH 171, W2RUF 162, WA2KQG 148, K2DNN 69, K2OFV 49, WB2GAL 41, WA2TUI 37, K2RYH 36, WA2ANE 29, WB2DPR 25, K2JBX 24, W2FCG 21, WB2HSK 21, K2BRE 20, WB2-JCE 20, K2IMI 19, W2RQF 15, W2PVI 12, W2QHQ 8, K2HOH 6, K2SSX 3, WB2DMU 2. (June) WA2ANE 20.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: W3LIV. RMs: W3KUN, K3-OOU and W3NUG. PAM: W3TOC. As no other nominations were received, John Wojtkiewicz, W3GJY, was declared elected and will take over as Sections Communications Manager for Western Pennsylvania. I want to wish the incoming SCM all the success in the world and I hope that the amateurs in the section will cooperate with him in every way. At this time I would like to thank the amateurs in the section for the wonderful support they have given me during my tenure as SCM, especially all those who have faithfully sent in monthly reports and kept the League appointments alive and also the club secretaries who forwarded their publications to this office. All the friendships that I have made through this office will always be cherished. The WPA Traffic Net meets Mon. through Fri. at 2100 GMT—on 3585 kc. W3LOS received his CP-30 sticker. K3OFB was seriously injured in a hit-run accident recently. The GPVHF Society's club call is WA3BAK. The Western Pennsylvania Mobileers Fall Round-up (hamfest) will be held Oct. 23, 1964, in the Wilkensburgh Boro Building. W3SDV is taking instructions for his private pilot's license. K3YVU is operating mobile and portable around Washington, D.C. New officers of the Breeze-Shooters are K3PLN, pres.; W3TVW, secy-treas.; W3SIR, checker; K3NJZ, W3KFH and WA3AHP, windgaugers. Traffic: (July) W3NEM 267, K3PYS 184, K3PIE 131, K3NZB 114, K3OOU 66, W3KUN 64, K3VAR 40, W3-UHN 27, W3LOS 25, W3IYI 15, K3SMB 10, K3VPI 2, W3JHG 1. (June) W3NEM 348.

CENTRAL DIVISION

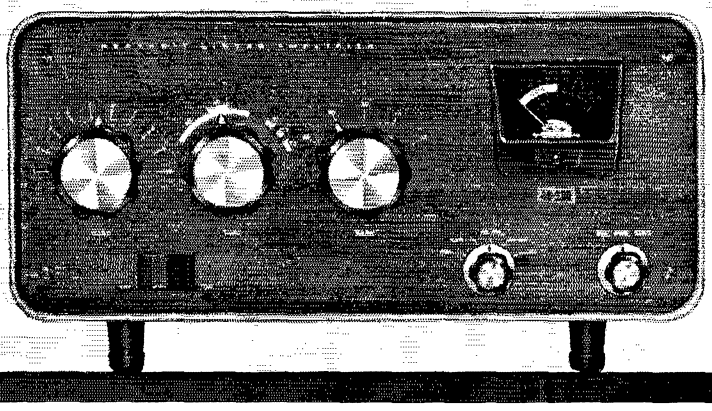
ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. PAM: W9VWJ. RM: W9USR. Cook County EC: W9-HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. The EC Net meets every Sun. at 1600 GMT on 3840 kc. WN9JHA is the youngest YL in this section. This 8-year-old ham just received her Novice Class ticket. The latest in an all-ham family is dad, WN9-JBD; Mrs. WN9MFD; son, WA9JBC; and daughter, WN9MEO. The SARA Hamnik was held in the Giant City State Park and a very pleasant eyeball QSO was held there with the gang. The North Central Phone Net Picnic also was held at Kankakee and a good time was had by all. K9BTE reports that the North Central Phone Net traffic count for the month was 665 messages. The Illinois division of the Ninth Regional Net reported a traffic report of 276. W9JDF has moved from Chicago to join the faculty of Duke University in Durham N.C. The Northwest Amateur Radio Club of Evanston provided communications for the Evanston Council of Boy Scouts for its Annual Jamboree June 6. K9DRS has a new Heath Cheyenne. WA9AWP is progressing on a 2-meter repeater for f.m. 146.95. 9Q5AB dropped into W9SKR's shack for a visit. He also visited W9-GFF, whose house guest was 5M6CKU. W9HAS is bringing in and working the rare ones on a new Hallicrafters SR-160 transceiver. K9UOV's new vocation is inhalation therapist at a local Chicago hospital. The Rockford Amateur Radio Assn. exhibited at the local 4-H fair with an FB booth. The Six and Two Ham Club, Inc. of Westmont was granted League affiliation by the ARRL's Executive Committee. W9PVD is sporting a new Heath transceiver for both mobile and fixed use. W9ERU lost his tower and beam in the windstorm of June 22. W9HOA's son-in-law, LU5ED, has returned home from Argentina. WN9KZZ, WN9LAP, WN9LLA, WN9LVM and WN9LXB are new Novice calls in the Rockford area. K9PXC is a new OO appointee. The recipients of the BPL award this month are WA9CCP, K9KZB and W9JDF. Traffic: (July) WA9CCP 1181, K9-KZB 744, W9HAS 150, K9CYZ 122, K9BTE 106, W9JDF 102, W9AKV 78, K9WUA 77, WA9AJF 51, K9GDQ 43, K9JXV 40, K9FBB 19, W9MAK 14, WA9FIH 8, W9PRN 8, W9SKR 8, W9LNQ 6, K9UOV 6, W9HPG 4, K9RAS 2. (June) K9UOV 6. (May) K9UOV 10. (Apr.) K9UOV 23.

INDIANA—SCM, Ernest L. Nichols, W9YYZ—Asst. SCM: Donald Holt, W9FWH, SEC: K9WET. PAMs: K9CRS, K9GLL, K9IVG. RMs: K9DHN, W9TT, W9-DGA. Net skeds in GMT: IFN 1330 daily and 2300 M-F on 3910 kc. ISN 0030 daily on 3920 kc. QIN daily at 0000 and RFN at 1200 Sun. on 3656 kc. New appointments: K9QJT as EC of Johnson Co. and WA9CXE as EC of Carroll Co. BPL winners: K9IVG, WA9AUM, K9-DHN and W9NZZ. QIN Honor Roll: K9VHY, WA9-IZR, K9DHN, K9HYV, W9ZYK, WA9RWY and K9-WWJ. W9DKR mobile installed a new Galaxy with good results on 75 meters. K9IVG was speechless for the first time after winning the Indiana Outstanding Amateur Award at the IRCC Picnic. The Montgomery Co. Emergency Net meets Tue at 7 P.M. on 145.35 Mc. with K9RNC as net control. WA9AUM is trying a 540-ft. long wire antenna, feeding through a new Johnson Matchbox. K9DHN hopes to operate from Purdue. W9-

(*Continued on page 116*)

#3 IN THE HEATHKIT® SSB SERIES

SB-200 LINEAR AMPLIFIER AT ONLY $200.00



• 1200 watts PEP SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—antenna relay solid-state power supply • Automatic Load Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit • Circuit breaker protection—no fuses • 120/240 volt operation

Handsomely styled to match the Heathkit SB-300 Receiver and SB-400 Transmitter, the new SB-200 is a completely self-contained desk-top KW Linear that provides globe-circling SSB power at tremendous savings!

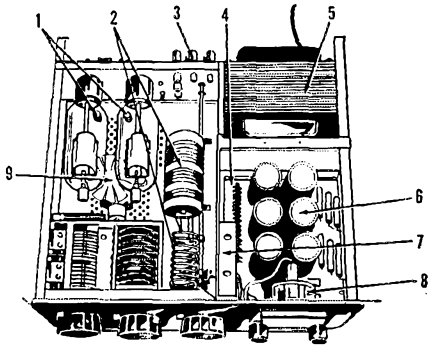
Many Advanced-Design Features! Incorporated in the SB-200 is a pre-tuned cathode input circuit for maximum efficiency and low distortion . . . ALC output for automatic exciter control . . . a rugged, well-rated solid-state power supply, protected by circuit-breakers (No fuses to replace or worry about) . . . two heavy duty 572B/T-160-L final amplifiers, fan-cooled for maximum life . . . complete shielding for maximum TVI protection and stability . . . plus a built-in SWR meter and antenna relay for full operating convenience. Antenna is automatically transferred to the exciter when the Linear is switched "off".

Quality Built Throughout! A heavy-gauge one-piece aluminum chassis, partitioned for extra strength and isolation of circuits . . . use of high quality well-rated components . . . and clean circuit layout all contribute to assure extra years of dependable, trouble-free performance.

Complete Operating Versatility! Compact and lightweight the SB-200 is an ideal companion for the SB-400 Transmitter, the soon to be released SB-100 Transceiver and nearly all other popular SSB & CW exciters in use today! Power supply operates on either 120 or 240 volt power sources for use anywhere. When you go "high power" choose the SB-200 for extra value, performance and dependability!

Kit SB-200, 38 lbs., $20 dn., $17 mo.....$200.00

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:** 70 to 100 watts, depending upon frequency. **Duty cycle:** SSB, continous 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 pretuned 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 572-B/T-160L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.) **Cabinet size:** 14⅞" W x 6¾" H x 13¾" D. **Net weight:** 35 lbs.



1. Two heavy-duty 572B/T-160-L tubes in parallel **2.** Separate pi-network output coils for 80-20 meters & 15-10 meters. **3.** Pretuned cathode input circuits **4.** Long-life silicon high-voltage rectifiers **5.** Conservatively rated 120/240 volt power transformer **6.** High capacity (125 mfd ea.) voltage-doubler filter capacitors **7.** Two manual-reset circuit breakers for power supply protection **8.** Switched panel meter measures SWR, Rel. Pwr., plate current, grid current, & hi-voltage **9.** Fan-cooled final amplifier compartment for long tube life.

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HEATHKIT®
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SSB-RECEIVER
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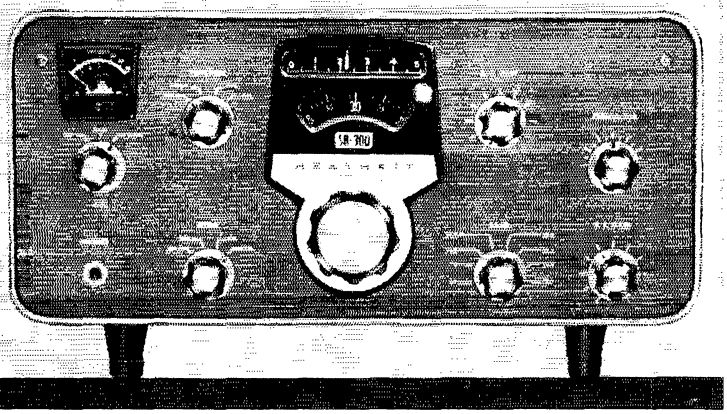

• Everything you could ask for in a deluxe receiver and more! • Complete coverage of 80 through 10 meter amateur bands with all crystals furnished, plus provision for VHF converters • Crystal-controlled front-end for maximum stability on all bands • 1 kc dial calibrations—100 kc per dial revolution provides bandspread equal to 10 feet per megacycle—tuning knob to dial ratio approximately 4 to 1 • Provision for transceive operation with matching SB-400 Transmitter • Pre-built Linear Master Oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly • Professional styling and features at 60% savings

Good news travels fast! . . . especially on the amateur airwaves! Since its introduction, the Heathkit SB-300 has set the amateur world on its ear as one of the finest values in the industry! Deluxe styling and features now bring you a new dimension in quality, performance and dependability never before thought possible in kit form! . . . and by doing the easy assembly yourself you'll save 60% the cost of comparable units!

Experienced amateurs will quickly recognize the high standards to which this receiver was designed. Its many superb features include a crystal-controlled front-end for optimum stability on all bands, a pre-built Linear Master Oscillator (LMO) for linear tuning with 1 kc dial calibrations, a built-in crystal calibrator, hermetically-sealed 2.1 kc crystal band-pass filter, smooth non-backlash vernier dial mechanism . . . and many, many more! Order yours today!

Kit SB-300, less speaker
22 lbs., $27 dn., $22 mo. $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
Export model available for 115/230 volts AC, 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:** Less than 100 cps per hour after 20 min. warmup under normal ambient conditions. Less than 100 cps for ±10% line voltage variation. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **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. **Audio response:** SSB: 350 to 2450 cps nominal at 6 db. AM: 200 to 3500 cps nominal at 6 db. CW: 800 to 1200 cps nominal at 6 db. **Audio output impedance:** Unbalanced nominal 8 ohm speaker and high impedance headphone. **Audio output power:** 1 watt with less than 8% distortion. **Antenna input impedance:** 50 ohms nominal. **Muting:** Open external ground at Mute socket. **Crystal calibrator:** 100 kc crystal. **Front panel controls:** Main tuning dial; function switch; mode switch; AGC switch; band switch; AF gain control; RF gain control; preselector; phone jack. **Rear apron connections:** Accessory power plug; HF antenna; VHF #1 antenna; VHF #2 antenna; mute; spare; anti-trip; 500 ohm; 8 ohm speaker; line cord socket; heterodyne oscillator output; LMO output; BFO output; VHF converter switch. **Tube complement:** (1) 6BZ6 RF amplifier; (1) 6AU6 Heterodyne mixer; (1) 6AH4 Heterodyne oscillator; (1) 6AU6 LM osc.; (1) 6AU6 LMO mixer; (2) 6BA6 IF amplifier; (1) 6AU6 Crystal calibrator; (1) 6HF8 1st audio, audio output; (1) 6AS11 Product Detector, BFO, BFO Amplifier. **Power supply:** Transformer operated with silicon diode rectifiers. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14¼" W x 6⅝" H x 13⅜" D. **Net weight:** 17 lbs.

FREE CATALOG
See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications . . . Send for Free copy!

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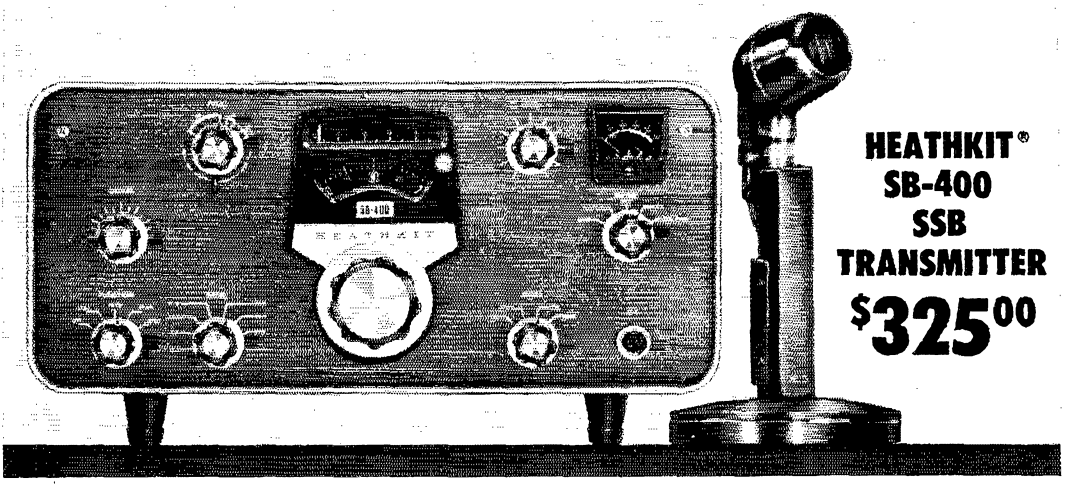

HEATHKIT®
SB-400
SSB
TRANSMITTER
$325.00

• 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 PEP 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 using CW sidetone • CW "shift" transceive operation to eliminate transceiver chasing • 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 amplifier antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "low-boy" styling

Here it is . . . the new Heathkit SB-400 Transmitter . . . second in the exciting new Heathkit series of Deluxe SSB Amateur gear! Following the same high standards set by the Heathkit SB-300 Receiver, the new SB-400 Transmitter now offers a matching counterpart that permits complete transceive operation with a host of advanced engineering design features for unmatched performance, versatility and operating convenience!

Unique mechanical design . . . prebuilt Linear Master Oscillator (LMO) . . . built-in heavy-duty power supply . . . sturdy chassis construction . . . beautiful modern styling . . . and power-packed performance are just a few of the many features that make the SB-400 your best buy in an SSB Transmitter! Order yours today for "Deluxe" communications at tremendous do-it-yourself savings!

Kit SB-400. . 33 lbs. . . Write for credit details. $325.00 Export model available for 115/230 volts AC, 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 ohm—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 under normal ambient conditions. Less than 100 cps for ± 10% line voltage variation. **Carrier suppression:** 55 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). **CW sidetone:** 1000 cps. **ALC characteristics:** 10 db or greater @ 0.2 ma final grid current. **Noise level:** 40 db below rated carrier. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** Less than 50 cps. **Oscillator feed-through/mixer products:** 55 db below rated output (except 3910 kc crossover which is 45 db). **Harmonic radiation:** 35 db below rated output. **Audio input:** High impedance microphone or phone patch. **Audio frequency response:** 350 to 2450 cps ±3 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅞" W x 6¾" H x 13¾" D.

WATCH FOR THE NEW SB-100 ALL-BAND SSB TRANSCEIVER SOON TO BE RELEASED!

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☐ Enclosed is $265.00 plus postage. Please send SB-300 Receiver.

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Prices and specifications subject to change without notice. AM-147R

(Continued from page 112)

JZA works 20, 40 and 80 with a 23-ft. vertical. W9QLW and WA9EZJ have new beams up. Many amateurs paid their last respects to W9QYQ. K9BSL is moving to Laporte. *Amateur radio exists because of the service it renders.* July net traffic: ISN 262, IFN eve. 128, IFN morn. 105, QIN 148, RFN 24, Hoosier V.H.F. 66 and 9RN 427 with Ind. represented 100%. Traffic: K9IVG 826, WA9AUM 545, K9DHN 543, W9MM 389, WA9BWY 316, WA9IZR 178, W9NZZ 165, W9ZYK 116, K9RWQ 109, W9QLW 100, W9YYX 57, K9MAF 51, W9TT 46, WA9DFQ 41, K9CRS 39, WA9CJR 36, W9BZI 32, W9-RTH 32, K9VHY 28, K9HYV 27, K9BSL 21, W9BUQ 20, K9WWJ 18, WA9KKR 16, WN9KAG 15, WA9CYG 13, W9SNQ 13, W9CC 12, W9DGA 12, W9FWH 10, K9GEL 10, K9ILK 7, W9BDP 5, W9DKR 5, W9DZC 5, WA9-AXF 4, K9UEO 4, K9QVT 2, K9KTL 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. RM: W9IQW. PAMs: W9NGT, W9NRP and K9IMR. Nets: WSBN on 3985 kc. daily at 2315Z, BEN on 3950 kc. daily at 2400Z, WIN on 3535 kc. daily at 0045Z at SWRN on 50.4 Mc. Mon. through Sat. at 0300Z. New appointees: WA9AKE as ORS, K9IMM as OES and W9ULM as EC for Marquette County. Renewed appointments: K9FPM as OES, K9PKQ and K9RIZ as ECs and W9SIZ as ORS. Net certificates went to W9NWK and K9CYZ for WSBN. W9VHP and W9-VIK now are using new calls, W5NND and WA5JWK, from Snowball, Ark. W9DYG has had visits from 28 out-of-town traffic men and he reports CAN going fine but traffic getting slow. W9VAJ is on from Milwaukee with a DX-100 and an HRO-5. WA9AKE, W9CXY, W9DYG, K9GSC and K9WIE helped Wisconsin to 98.7% representation on the 9RN in July. Net reports for July: WIN, 90 offered, 67 cleared, in 9:22 by 160 check-ins; WSBN, 455 offered, 361 cleared in 20:47 by 998 check-ins; BEN, 122 offered, 83 cleared in 23:28 by 755 check-ins. All nets report decreased activity during the summer months. BEN managers would like to see most informal traffic on nets changed to formal. A RPL certificate for July traffic-handling went to K9IMR. Traffic: (July) K9IMR 404, W9DYG 342, W9CXY 240, WA9AKE 69, K9GSC 69, W9CBE 64, W9IQW 46, K9GDF 38, K9WIE 38, W9HPC 35, WA9EDZ 27, W9VAJ 26, W9OTL 18, W9FNT 13, K9DGY 11, K9DBR 9, K9QKU 8, K9UUT 5. (June) WA9AKE 29, K9UUT 4.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØOPX—Asst. SCM: Emerson Mejdrich, WØTCK. SEC: WAØBZG. RMs: WAØEPX, KØJFJ. PAMs: KØFLT, KØVPJ. MSSB PAM: WØHEN. Appointments issued: KØJFJ as RM, KØVPJ as OPS and PAM, KØLWK as OPS. Eighty-eight registrants, including SCM WØOPX and Director WØBUO, enjoyed the Rochester ARC and Piconet Picnic held July 19. Subject matter for the meeting was slides, tapes and commentary of the Civil Defense Drills of Piconet. The commentary was by Asst. Dir. WØTJA, photos by OPS KØZIW. Approximately 95 registrants enjoyed the July 26 picnic and meeting of the Mankota ARC. Talks were given by Dir. WØBUO and SCM WØOPX. Secy.-treas. KØRSL reports that WNØJRA and WNØJQR are new members of the newly-formed Tri-State ARC which was very active in the FD Test. The Order of Golden Shovel Picnic was enjoyed by many hams at Grand Rapids. WAØ-EDN visited at the QTHs of WØHEN, WØFFX and WØFFV. WØZIW is working hard to accustom himself to the new W9HQW call imposed by a 1000-ft. move in QTH to Trempealeau, Wis. WØILG has moved to W6-Land. Vice Dir. WØMXC spent a pleasant week end operating portable from Painsville, Minn. OPS/ORS WAØARA has a new NCX-3; PAM WØHEN a new TR-3. A senior MSN member and former ORS, WØFLK, is now OBS on RTTY. KØPSE now signs as WA4UHG from Myrtle Beach AFB, S.C., where he is now serving as ground radio operator. What may well be the first amateur radio station operation from the Apostle Island chain in Lake Superior is claimed by WØBYG and KØMVI, who operated portable 9 from Hermit Island. WØOPX and WØRIQ have enjoyed summer visits by ex-ORS KØSNC and WØTHY. Former SCM WØRA is grateful to two neighbors who permitted the end of a much-needed 80-meter antenna on their property. MSN member KØIHD is busy working as state training dir. of Army MARS. Old friends WØTZA (KØFDB), WØOJG, WØTUS and WØALW are active AF MARS officials. A Silent Key is WØIXI of Mankota. Traffic: KØJFJ 161, WAØIAW 90, WAØDSH 73, WØHEN 58, KØKJS 56, WØRA 54, KØZKK 46, KØIHD 45, KØIJU 42, KØIKU 42, KØZRD 42, WAØFCJ 41, WAØEDN 40, KØERQ 40, KØFLT 40, WAØEPX 35, KØZIW 35, KØJYJ 33, WØOPX 33, WØUMX 28, WAØEZQ 24, KØVPJ 24, KØMIA 23, WØKYG 18, WAØAAM 16, KØICG 16, WØRIQ 16, WAØACI 15, WØLIG 15, WAØBZG 11, WØKJZ 11, KØIKU/Ø 10, WØMXC 10, WAØARA 7, WAØDVH 7, KØUBA 6, KØRCF 5, KØLWK 4, WAØDFT 2.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—Asst. SCM: Jene H. Melton, WAØDEM. SEC: WØ-SCT. RM: KØGSY. This month's SEC report is the sixty-first Lester has submitted without missing a month or being late! WØBLK, Black Hills ARC, Inc., held a QSO Party on Mt. Rushmore, July 19 and 26. KØYOV, formerly of Bottineau, N. Dak., now is located in Trent. KØFKJ reports working Massachusetts and Vermont via 50 Mc. for his 40th and 41st states—all confirmed. WAØDEM is transmitting Official Bulletins 20 times weekly, 3.5-through 21-Mc. A.M. and s.s.b. He reports swapping equipment for a new SX-115 and HT—32B. The DX record for WØSMV is 250/260. Can anyone in South Dakota beat it? Traffic: KØGSY 166, WAØAOY 115, KØVYY 75, WØSCT 57, KØBMQ 17, WAØFUZ 15, KØTXW 14, WAØCVZ 8, KØZBJ 8, WØZWL 8, WØDIY 4, WØGWW 4, WØFJZ 4, KØKOY 4, WAØBMG 3, KØBSW 3, WØDVB 3.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAMs: WA5GPO and K5IPS. NM: WA5AVO. WA5GPO reports that activity on the Ark. S.S.B. Net was up 31% over last month with traffic up 32%, and the following were top QNIers: WA5CAW 30, WA5GPO 28, W5NPM 26, W5DTR 24, WA5AVO 20. K5ABE 19 and WA5IEQ 15 out of 30. K5TYW reports activity high on OZK with top QNIers WA5CBL 26, K5ABE 25, W5JWL 25, WA5AVO 24, W5-NPM 23, and W5DTR 20 out of 31. W5NPM is the new call of our SEC, ex-W9PHR/5. K5CQP built a T-150 and is now on 75 meters with an FB signal. K5PRE almost has his T-150 completed. The CAREN held an evening picnic Aug. 6 in lieu of its regular meeting. Would you like a copy of the Arkansas ARPSC Bulletin? Send a card to me (SCM address page 6). Join the AREC and participate in the 1964 Simulated Emergency Test Oct. 3-4. Your help is needed. Start planning now for the Nov. 15 and 22 Sweepstakes. Net reports (July):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Avg. Tfc.*
OZK	3790	0100Z	Daily	31	156	268	5.1
QAN	3695	0400Z	Daily	30	83	155	2.8
AEPN	3885	1200Z	Mon.-Sat.	26	95	970	3.6
ASBN	3815	0030Z	Daily	30	81	299	2.7

Congratulations to WA5AVO who won top honors and a new ARRL *Handbook* in the Arkansas C.W. Net Contest. WA5HNN has received OZK Certificate No. 20 and WA5CBL No. 21. W5YM was active in the "Powder Puff Derby" recently at the Fayetteville Airport, reports K5ALU. K5ABE has Lee County covered after one month as EC. WA5CBL is the new Asst. EC for Pulaski County. RN certificates 10 and 11 went to WA5AVO and K5IKA. W5NPM and W5DTR made a trip to Ft. Smith Fayetteville, Bentonville, Siloam Springs, Harrison, Marshall and Conway the week end of Aug. 15. Traffic: WA5AVO 314, W5NPM 254, W5DTR 188, W5JWL 185, WA5HNN 101, K5TCK 60, K5TYW 56, WA5GPO 53, WA5CBL 49, WA5BBS 34, K5ABE 21, W5NIJ 21, K5IPS 18, WA5EKA 16, K5EDH 11, K5ALU 9, WA5BQL 9, K5FST/5 9, WA5BQI 8, K5GKN 7, K5AKS 1.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Congratulations to the Jackson Amateur Radio Club on the fine hamfest. Glad to have good eyeballs with friends like W5IZS, W5SHX, K5UYP, W5IHP, W5SSZ, W5MUG and many, many others. The sideband dinner the night before was a fine success. K5BPR has gone mobile with a fine signal. W5OSA has been having a ball mobile on 75, 40 and 20 meters. The last three months have been the best the Mississippi C.W. Net has ever had, according to SEC W5JDF, who also reports more activity evidenced as far as ECs are concerned. Glad to hear W5UOO and K5MFY back on the air. WA5CAC is very active on s.s.b. and c.w. W5CQJ is one of the best bulwarks of 3925. Traffic: W5JDF 107, W5EMM 7.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. RM: W4MXF. PAMs: W4RMJ, K4-WWQ, WA4AIS.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Avg. QTC*
ETPN	3980	0640E	M-Fri.	21	36	431	1.7
TSSB	3980	1830C	M-Sat.	27	42	834	1.6
TN	3635	1900C	M-Sat.	27	96	231	3.6
PPN	3980	0645C	M-Sat.	31	160	720	5.1
		0800C	Sun.				

(Continued on page 118)

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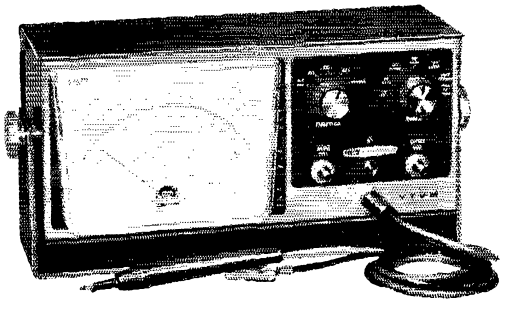


Deluxe "Service Bench" VTVM

• Finest quality throughout for accuracy, reliability, ease of operation • Gimbal bracket for easy bench, shelf or wall mounting • Single AC/OHMS/DC test probe with switch

SPECIFICATIONS—Meter Scales DC & AC (RMS): 0-1.5, 5, 15, 50, 150, 500, 1500 volts full scale (1.5 and 5 volt AC ranges read on separate scales). **Ohmmeter:** Scale with 10 ohm center x1, x10, x100, x1000, x10K, x100K, x1 meg. Measures 1 ohm to 1000 megohms with internal battery. **Multipliers:** 1% precision type. **Meter:** 6" 200 ua movement. **DC input resistance:** 11 megohms (1 megohm in probe) on all ranges. **AC input impedance:** 1 megohm shunted by 40 uuf (measured at input terminals). **Circuit:** Balanced bridge (push-pull) using twin triode. **Accuracy:** DC ±3%, AC ±5% of full scale. **Frequency response:** ±1 db 25 cps to 1 mc (600 ohm source). **Tubes:** 12AU7, 6AL5. **Battery:** 1.5 volt size "C" flashlight cell. **Power requirements:** 105-125 volts 50/60 cycle AC 10 watts. **Dimensions:** 5" H. x 12¾" W. x 4¾" D.

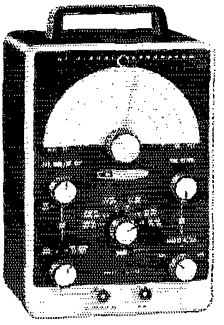
Kit IM-13, 5 lbs....$32.95 *Wired IMW-13...$49.95*

Heathkit RF Signal Generator

• Wide frequency range—100 kc to 220 mc in six bands • Prewired, prealigned coil-bandswitch assembly • Large, easy-to-read frequency scales • 2% accuracy • Easy to build

SPECIFICATIONS—Frequency range: Band A, 100 kc to 320 kc; Band B, 310 kc to 1.1 mc; Band C, 1 mc to 3.2 mc; Band D, 3.1 mc to 11 mc; Band E, 10 mc to 32 mc; Band F, 32 mc to 110 mc. **Calibrated harmonics:** 110 mc to 220 mc. **Accuracy:** 2%. **Output:** Impedance, 50 ohms; Voltage, 100,000 uv. **Modulation:** Internal, 400 cps, 30% depth; External, approx. 3 V across 50 k ohms for 30%. **Audio output:** Approx. 10 V open circuit. **Tube complement:** (1) 12AT7, (1) 6AN8. **Power requirements:** 105-125 V 50/60 cycles AC, 15 watts. **Dimensions:** 6½" W. x 9½" H. x 5" D.

Kit IG-102, 6 lbs.....$27.95



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Use with any 11 megohm VTVM for RF measurements up to 250 megacycles. Ideal for use in Amateur Radio work!

Kit 309C, 1 lb.....$3.50
Assembled 309W-C, $4.50

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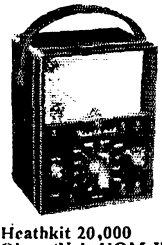
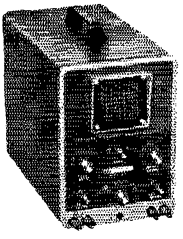
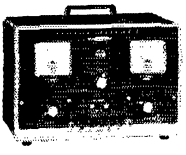


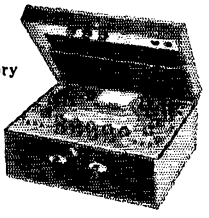
Heathkit 20,000 Ohms/Volt VOM Kit
Kit MM-1, 5 lbs.
.....$29.95



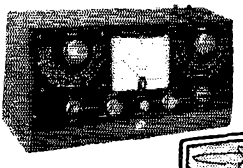
Heathkit General Purpose 3" Oscilloscope Kit
Kit IO-21, 11 lbs....$59.95



Heathkit Laboratory Variable-Voltage Regulated Power Supply Kit
Kit IP-32, 16 lbs...$56.95
Wired IPW-32 .....$84.95



Heathkit Mutual Conductance Tube Tester Kit
Kit TT-1A, 33 lbs...$149.95



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(*Continued from page 116*)

W4SGI has departed for five months overseas civilian duty. The Crossville Hamfest was well attended with over 225 registered. Helen, W4WLH, was injured in a fall. The section wishes her a rapid, full recovery. WA4OXL is active from Crossville on TN adding to the total QNI increase. W4OQG reports on active operations of the Shelby AREC, including transmitter hunts and Mental Health Drive assitance. The Tenn. Council of ARC was organized at Crossville with W4WBK as president and eight clubs represented. W4RRV is looking for EC appointees toward having a 6-meter state-wide emergency net. You are reminded that activity reports are due by the sixth of each month. Traffic: W4ZJY 237, WA4HRG 225, W4PQP 174, W4MXF 137, WA4IUM 101, W4HPN 30, W4UVP 29, W4PFP 24, W4TZJ 22, W4VTS 18, W4VNU 17, WA4IBZ 16, W4RMJ 16, K4WWQ 14, W4YAU 13, WA4MCC 12, W4SGI 12, WA4EWW 6, K4-LPW 5, WA4NUJ 5, WA4GLS 4, K4LTA 4, W4TYV 4, K4WUG 4, K4JXG 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Shafer, K4-QIO—SEC: K4URX. PAMs: W4BEJ, W4SZB, K4DMU. V.H.F. PAM: K4KJQ. RM: WA4LCH. Appointments for July: K4DMU as PAM KPN, K9ALP/4 as OPS. K4DMU as OPS and K4DZM as ORS. July net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	0630E	M-F	24	276	36
MKPN	3960	0830E	Daily	30	448	46
KYN	3600	0900 & 1900E	Daily	62	608	262
KPN	3960	1930E	M-F	23	574	30

Newly-affiliated ARRL Clubs are the University of Lexington Amateur Radio Club and the Muhlenberg Amateur Radio Society. Ky. was represented 93.5% in 9RN with WA4LCH top QNI. The Central Ky. Emergency 6-Meter Phone Net furnished communications for the Powder Puff Derby July 4, 5, 6 and 7 with 11 club members participating. K4KJQ will be keeping schedules with his son, KOYSU, who will be oprating portable KL7 from Cape Romanzof, Alaska, for the next year. A personal friend of many amateurs in Kentucky was W9QYQ, who became a Silent Key July 31 in Louisville. Crystals for 7050 are desired by Novices in Louisville. If you can furnish any, please send them to WN4RVP. Operation Avalanche was carried out by RACES and Red Cross in Louisville. Mobile units were set up at the various hospitals and approximately 30 messages were handled to and from the hospitals. On Nov. 14 the ARTS will have a meeting at the Ky. Hotel in Louisville. Also that afternoon (Nov. 14) there will be a meeting of all Ky. ARRL appointees at the Ky. Hotel to discuss our varios problems, especially traffic on the nets and liaisons to other nets. SEC K4URS will meet with the ECs at the same time. K4SUD and K4VTY will be going to U. of Ky. this fall and K4-DMU will return to Bellarmine. W4JUI will make a trip to California to see his new grandchild. WA4PNT got one of the Clegg '99ers at the Bowling Green Hamfest. Traffic: WA4LCH 260, W4BAZ 127, WA4BSC 111, WA4-AYH 62, K4DMU 55, K4DZM 51, K4VDO 29, W4BTA 22, W4CDA 17, W4SZB 12, W4KJP 10, K4LOA 10, W4YYI 9, W4JRA 7, WA4ENH 6, WN4RVP 6, W4BEW 5, W4ZNV 5, WA4ILW 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8FWQ, K8-KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAM: W8PT. Appointments: W8NDM as EC; W8FDO, W8-IBR, W8ILP, W8MGQ, W8WVL, K8MFO as ORSs; K8CKD, W8CQU, W8IWF, W8JYJ, K8VDA, as OPSs; WA8HYR as OES. The Southwestern Mich. Two-Meter Net meets Mon. at 0100 GMT on 145.26 Mc. with good turnouts, W8CVQ as NCS. W8PT has the same results using a 416B preamplifier for 220 Mc. as he has with the 6CW4. W8EMD now has three 34-ft. vertical steel towers on insulators spaced in a triangle with switching for 7 Mc. and says it's the best he's ever used. Over 400 registered at the Southwest Michigan V.H.F. Annual Picnic at Allegan County Park Aug. 2. About 250 registered at the Sault Ste. Marie U.P. Hamfest Aug. 1 and 2. W8AKR and W8EYA took a trip to Yellow Knife, just below the Arctic Circle. The Huron Valley ARA is working on an Ann Arbor Hospital Public Service project. This deserves all support from hams in that area. WA8CXF says her traffic report will pick up after her 4 QRMers are back in school. K8JJC ran an approximate score of 195,555 in the July CD Party, but had ignored two cancellation notices of his ORS appointment, which was cancelled. K8IHY took a trip to California, lost his luggage, had an accident and his kids got chicken pox. W8ZCH and W8QMF provided communications for the local soap box derby. Four clubs, the *Michigan* 6-*Meter*, the Mobileers, the Greater Pontiac V.H.F. and the V.H.F. Association had a big picnic at Bald Mountain in July. Note that K3UIG/K7UGA signs his mail "With best 73's." Will someone tell Barry that "73" means "best wishes"! A V.H.F. Message Net Service has been formed, covering Michigan, Ohio and Pennsylvania with skeds Sat. (1800) and Sun. (1400). Dunno if GMT or EST! Let's use GMT, or can't you figger it? Traffic: (July) K8KMQ 244, K8NJW 200, K8-WQV 176, K8ILR 164, K8IUZ 119, W8BEZ 87, WA8ENO 77, W8ELW 71, W8EJR 59, WA8DZP 51, W8FWQ 49, W8-RTN 47, WA8CPH 25, W8IKT 21, W8FX 20, K8VDA 19, W8DSE 13, K8EXE 12, W8ZHB 12, W8AHV 0, W8-EGI 4, K8GJD 2, W8AAM 1, (June) W8EJR 58, W8IBB 10, WA8CZJ 5, W8FDO 4, W8IWF 4, K8VFR 2.

OHIO—SCM, Wilson E. Wecker, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8UNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8WZK, K8BAP and K8UBK. The Six Meter Nomad's *The Amateur Extra* announces that the club with W8JBS, W8URV and K8-VJB, provided communications for the Independence Day Band Sectional Parade and held a stag cookout supper. Columbus ARS's *Carascope* announces three stinging blows in telling us that W8VHO, W8IJ and W8GGG have joined the Silent Keys. W8VHO gave a lot of time to blind amateurs and his efforts, along with those of W8WZ, enabled the amateurs of Ohio to have their calls on automobile license plates. Another noted Ohioan, W3BKE (ex-W8BKE), also has joined the Silent Keys. W8DAE now talking: Week was unable to get to the picnic but Marge and I attended. There were 24 hams present—W8VYT, W8DAE, W8CHT, W8-BZX, W8TV, W8ECB, W8QHW, W8DDG, W8IEP, W8-FYO, W8DHG, W8VTP, K8ONQ, K8MTI, K8HFL, W8-DDG, K3TDR (of W8LT), K8LVC, K8HGI, K8LGA, K8LGB, WA8FAE, WA8GYX and K8EZT. There were *8 wives and* 14 *children. Six hams made the long trek* from Cincinnati. We had a constructive net meeting and a good time all around! WA8KCB has a new HQ170-A. W8BZX has too many 12-hour days at the shop. He says, "The lure of money!" W8GIU revamped the shack and installed a home-brew two-element 10-meter beam during July. W8GRG reports for the OSSB Net, including six reporters. Nice going, Pat. W8UPM and W8DAE made the BPL in July. W8ANQ reports that the Eastshore V.H.F. Radio Club provided communications for the Sports Car Rally (held for blind children) at Highbrook Lodge. Traffic: W8UPH 676, W8DAE 319, WA8CNY 176, WA8HVR 142, K8LGA 108, K8UBK 103, WA8GYT 95, K8BAB 89, W8MGA 85, W8GRG 67, W8-CHT 47, WA8BZR 39, WA8FKD 24, WA8AWH 20, W8BZX 18, W8CNM 14, K8LGB 10, K8PRE 10, K8RXD 9, W8EEQ 5, W8ERD 4, K8ONQ 2, K8DDG 1, K8RKY 1.

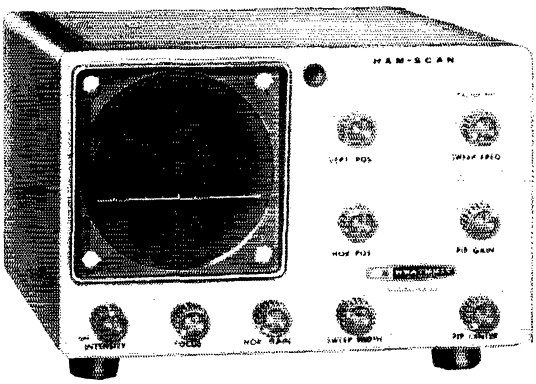
HUDSON DIVISION

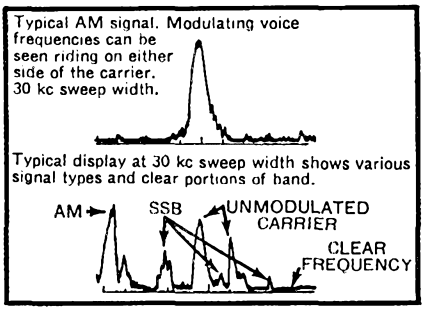
EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2-VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2200 GMT. Emergency Coordinators on 146.550 kc. Fri. at 0015 GMT. Appointment: WA2DWU as ORS. Endorsement: WA2-LJM as ORS. Welcome to the Poughkeepsie ARC as an affiliated club; K2GCH is secretary. July found the Albany Club holding a picnic meeting at Thatcher Park. WB2IIZY has a new beam and keyer for 6 with a 50-watter in process. WB2HYA has a Heath Twoer and is a new MARS member. WB2FYP is a new General and the son of W2URP, e.w. traffic man. K2IDEM reports 100/92 as his latest DX record. K2SFY is the new State Radio Officer for New York State RACES replacing W2BGO, who held the position several years. WA2WGS reports receipt of the USACA-500 award. Also among awards, WB2NNA has a QRP-100 endorsement. WB2HBI is a new traffic-handler with a T-150a and a homemade receiver. Congratulations, K2DEM and K2UTC submitted reports for the May FMT. WA2-JWL was communications advisor for the teen-age rocket group in the Albany area. Expert traffic-handler WA2-HGB is attending Cornell. The ARPSC in Westchester handled a four-day golf tournament assisted by WB2-EXB, WA2QEG, WA2OMT, WA2MHY, WB2NDL, WB2-NDK, WA2OBZ, WA2JZA, WA2ZPD, WA2USL, WA2-AUC and K2JQB. A city swimming meet in New Rochelle was radio coordinated by K2EBX, WBB2FSQ, WA2NRB and WA2NRJ. WB2FXB is manager of the 2-meter ARPSC net in Westchester; WA2OOQ is manager of its 15-meter net. Traffic: WA2UZK 407, WA2-VYS 227, WA2MHY 109, WB2FZC 76, WB2HBI 50, W2-PKY 48, WM2CPU 46, W2URP 40, WA2HGB 39, WA2-HGB 39, WA2VYT 37, WB2FXB 35, W2ANV 34, WA2-JWL 34, WB2FVD/1 27, WB2NNA 23, K2SJN 22, W2-THE 20, WB2HYA 9, WB2HZY 6, WA2WGA 4.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC: K2OVN. Section nets:

(*Continued on page 124*)

WATCH IT!... WITH THE





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Identifies signal types. SSB, AM & CW signals are clearly identified with the "Ham-Scan" even though they may be up to 50 kc away and clear portions of the band are easily identified without continuous tuning. It will also prove useful in spotting both phone and CW DX stations operating off your frequency and is invaluable during VHF band openings. Also checks carrier and sideband suppression of SSB transmitters and aids in identifying "splattering" received signals.

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SPECIFICATIONS—Receiver IF: 455, 1600, 1650, 1681, 2075, 2215, 2445, 3000, 3055, 3395 kc. **RF Amplifier—Response:** ±0.5 db at ±50 kc from receiver IF. IF—350 kc. **Sensitivity:** Approx. 100 uv input for 1" vertical deflection at full gain setting. **Horizontal deflection—Sweep generator:** Linear sawtooth, recurrent-type (internal). **Frequency:** 10 to 50 cps, variable. **Sweep width:** 30 kc or less, to 100 kc ±20%. Continuously variable. (Approx. 15 kc to 100 kc for 455 kc IF). **Resolution:** 1.5 kc (frequency difference between two 1" pips whose adjacent 3 db points coincide. Measured at slowest sweep speed and at 30 kc sweep width). **Power supply:** Transformer operated, fused at ½ ampere. **Low voltage:** Full wave voltage-doubler circuit provides 250 volts @ 20 ma, & 580 volts @ 6 ma. **High voltage:** Half wave circuit provides −1600 volts @ 1 ma for CRT. **Power requirements:** 120 volts AC, 50/60 cps, 40 watts. **Tube complement:** 3RP1 CRT (medium persistence green trace), 1V2 HV rectifier, 6AT6 detector, 6EW6 RF amplifier, 6C10 sweep generator/horizontal amplifier, (2) 6EW6 IF amplifier, 6EA8 Oscillator/mixer, (4) 500 ma silicon diode low voltage rectifiers, crystal diode, 1N954 voltage-variable capacitor. **Controls:** On-off/intensity, focus, horizontal gain, sweep width, pip center, horizontal position, pip gain, vertical position, sweep frequency/AGC, astigmatism. **Dimensions:** 5¼" H x 7⅞" W x 11" D.

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RIVERSIDE-Mission Ham's Supply, 3316 Main St.
Electronic Supply, 2486 Third St.
SACRAMENTO-Selectronics, 4128 Franklin Blvd.
SAN DIEGO-Western Radio & TV Supply, 1415 India St.
SAN FRANCISCO-Amrad Supply Inc., 3425 Balboa Street
SAN JOSE-Quement Electronics, 1000 S. Bascom Ave.
VAN NUYS-Edison Electronic Supply Co., 17635 Sherman Way

COLORADO-DENVER-Burstein-Applebee Co., 1237-16th St.
Electronic Sales, 1452 South Lafayette

FLORIDA-ELLENTON-Bill Slep Co.
ORLANDO-Amateur Electronics, 23 Azales Park Shopping Center
TAMPA-Kinkade Radio Supply, 1719 Grand Central Ave.

GEORGIA-ATLANTA-Specialty Distributing Co., 763 Juniper St., N.E.
HAPEVILLE-Southeastern Radio Parts Co., 565 No. Central Ave.

HAWAII-HONOLULU-Honolulu Electronics

ILLINOIS-CHICAGO-Allied Radio Corp., 111 N. Campbell Ave.
Amateur Electronics Supply, 6450 N. Milwaukee Ave.
LINCOLN-AAA Sales, 555 Woodlawn Rd.
PEORIA-Klaus Radio & Electric Co., 403 East Lake St.
Warren Radio, 308 Oak Street
ROCKFORD-H&H Electronics Supply, 506-510 Kishwaukee St.
SPRINGFIELD-Bruce Electronics, 1120 East Capitol Ave.

INDIANA-INDIANAPOLIS-Van Sickle Radio Supply Co., 4131 N. Keystone Ave.

IOWA-COUNCIL BLUFFS-World Radio Lab., 3415 W. Broadway
IOWA FALLS-Marchant Electronic Sales & Service

KENTUCKY-LEXINGTON-Barney Miller's Inc., 232 East Main St.
SOMERSET-Hobe's Radio & Electronics

LOUISIANA-NEW ORLEANS-Crescent Electronic Supply, Inc., 537 S. Claiborne Ave.
SHREVEPORT-Ports Electronic Parts Co., 2423 Southern Ave.

MARYLAND-BALTIMORE-Amateur Radio Center, 2203 North Fulton Ave.
WHEATON-Electronics Distritubors, 11324 Fern Ave.

MICHIGAN-DETROIT-Duffy Company, 2040 Grand River Ave.
Radio Supply & Engineering Co., 90 Seldan Ave.
KALAMAZOO-Warren Radio Co., 1710 South Westnedge
LANSING-Main Electronics, 700 West Barnes Ave.
MUSKEGON-Electronic Distributors, Inc., 1960 Peck St.

MISSOURI-KANSAS CITY-Burstein-Applebee, 1012 McGee

NEVADA-LAS VEGAS-Reliable Service Co., 1815 Industrial Rd.

NEW MEXICO-ALBUQUERQUE-Albuquerque Aircraft Radio, 6605 Elwood Drive

NEW YORK-JAMAICA, LONG ISLAND-Harrison Radio, 139-20 Hillside Ave.
NEW YORK CITY-Harrison Radio, 225 Greenwich

NORTH CAROLINA-ASHVILLE-Freck Radio, 38 Biltmore Ave.

NORTH DAKOTA-MINOT-John Iverson Co.

OHIO-CLEVELAND-Bernon-Ray Service, Inc., 2118 E. 21st St.
Olson Electronics, 2020 Euclid Ave.
Pioneer Electronic Supply Co., 5403 Prospect Ave.
CINCINNATI-Coston's Electronic Distributors, 2345 Ferguson Rd.
The Mytronics Co., 2145 Florence Ave.
COLUMBUS-Universal Service, 114 North Third St.
DAYTON-Srepco Inc., 314 Leo St.
SPRINGFIELD-Lafayette Radio, 217 N. Belmont Ave.
TOLEDO-Selectronic Supplies, 3185 Bellevue
YOUNGSTOWN-Armies Electronics, 320 West Federal St.

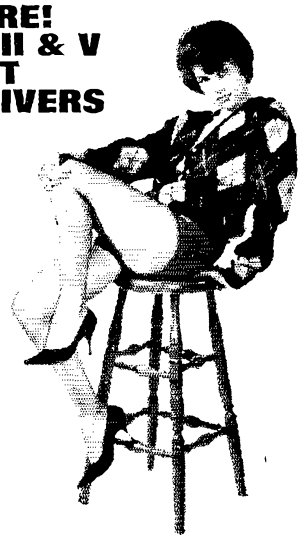
OKLAHOMA-OKLAHOMA CITY-Bob's Amateur Electronics, 1139 North May Ave.
TULSA-Radio Inc., 1000 Main St.

OREGON-PORTLAND-Portland Radio Supply, 1234 S.W. Stark St.

PENNSYLVANIA-HAVERTOWN-Kass Electronics, Darby Road & W. Chester Pike
PHILADELPHIA-Radio Electric Service Co., 7th & Arch Streets

TENNESSEE-NASHVILLE-Electra Distributing Co., 1914 West End Ave.

THE BEST BUY ANYWHERE! GALAXY III & V 300 WATT TRANSCEIVERS



102 DISTRIBUTORS

TEXAS-BROWNSVILLE-Electronic Equipment & Engineering Co.
Rio Radio Supply, Inc., 1129 East Jefferson
CORPUS CHRISTI-Electronic Equipment & Engineering Co., 805 S. Staples
Wicks Radio Equipment, 513-15 S. Staples
DALLAS-Amateur Electronics, Inc., 2802 Ross Ave.
Crabtree's Electronics, Inc., 2608 Ross Ave.
EL PASO-Sunland Supply Co., 2227 Texas St.
FT. WORTH-Ed Juge Electronics, Inc., 1514 Pennsylvania Ave.
HARLINGEN-Electronic Equip. & Eng. Co., 817 W. Tyler
Rio Radio Supply, Inc., 117 East Monroe
HOUSTON-Busacker Electronic Equip. Co., Inc., 1216 W. Clay
Electronic Equipment & Engineering Co., 2606 Westheimer
Madison Electronics Supply, 1508 McKinney
LUBBOCK-Edwards Electronics, 4124 34th Street
McALLEN-Rio Radio Supply Inc., 608-10 S. Broadway
PORT ARTHUR-Texas Electronics Co., 1234-36 Seventh St.
SAN ANTONIO-Radio & TV Parts, 1828 N. St. Mary's St.
VICTORIA-Electronic Equip. & Eng. Co., 1007 N. William
WACO-The Hargis Co., Inc., 1205 Washington Ave.
WICHITA FALLS-Clarks Radio Supply, 2410 B Tenth

WASHINGTON-EVERETT-Pringle Electronics Supply, 2101 Colby Ave.
LYNWOOD-Cascade Electronics Supply, Post Office Bldg.
SPOKANE-HCJ Electronics, 6904 - East Sprague

WEST VIRGINIA-CLARKSBURG-Mountain Electronics, 720 Pike St.
HUNTINGTON-Mountain Electronics, 611 Seventh Ave.

WISCONSIN-MILWAUKEE-Amateur Electronic Supply, 3832 West Lisbon Ave.

OVERSEAS DISTRIBUTORS

Miller's Agencies & Enterprises (Pty) Ltd.,
P.O. Box 40, Potchefstroom, South Africa

Sideband Electronics Engineering
Arie Bles, 33 Plateau Road, Springwood, NSW, Australia

Tioneb Radio & TV
436 11th Street, Quebec City, Canada

Deksa, S.A.
Tabasco #165, Mexico 7, D.F.

Felix Alberto & Co., Inc.
Pleasant Hills, Mandaluyong, Rizal, Philippines

F. Guevara
Ave Maracaibo, Urb las Palmas, Caracas, Venezuela

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64-14 Woodside Ave., Woodside, N.Y. 11377

GALAXY ELECTRONICS
10 S. 34th St., Council Bluffs, Iowa 51504

...and for modern, low-profile Mobile Communication Equipment there's the new ultra-low profile, single-ended Amperex 8505

With an envelope profile that's shorter...with a power gain that's higher...with construction that's finer...and with all this at a price that's lower...the new single-ended indirectly-heated Amperex 8505 beam power tetrode is just what the designer of mobile communications equipment ordered.

Designed for use as an RF amplifier, frequency multiplier, oscillator, AF power amplifier or modulator at frequencies up to 250 mc, the 8505 fills a long-felt need for a VHF tube in the 35 to 55 watt power output category that is truly new.

Because it is so much shorter than equivalent types, and because its single-ended construction eliminates top-of-chassis circuitry, the 8505 permits the design of appreciably more compact communications packages. Its high power gain—just 2.2 watts drive power will deliver 55 watts to the load at 175 mc—results in major savings since low cost driver components can be used. Its professional construction techniques and materials—including longer exhaust and aging, kovar and molybdenum pins, gold plated grids, molybdenum grid wire, hard glass envelope, magnoval powdered-glass base, and heavy gold-plated anode pin terminal—insure exceptional reliability, uniformity and long life.

SIGNIFICANT CHARACTERISTICS
CLASS C RF AMPLIFIER AT 175 Mc

	CCS	PUSH-TO-TALK SERVICE
DC Plate Voltage	450	500 volts
DC Grid No. 2 Voltage	220	247 volts
DC Grid No. 1 Voltage	—50	—50 volts
DC Plate Current	134	175 ma
Useful Power Output	38	55 watts
Drive Power	1.6	2.2 watts

The special low-cost socket required in conjunction with the 8505 is available from Amperex.

For complete data on the new 8505, write: Amperex Electronic Corporation, Tube Division, Hicksville, Long Island, New York 11802.

Amperex®

IN CANADA: PHILIPS ELECTRON DEVICES LTD., TORONTO 17, ONT.

Station Activities

(*Continued from page 118*)

NLI	3630 kc.	2315Z Nightly	WA2EXP,	RM
VHF Net	145.8 Mc.	0000Z TWTh	W2EW,	PAM
VNF Net	145.25 Mc.	2300Z FSSnM	W2EW,	PAM
NYCLIPN	3932 kc.	2000Z Ex Sun.	WA2QJU,	PAM

Listen, this is important: We have an election going on right now for the Directorship and Vice-Directorship of *our* Hudson Division. What we do here decidedly affects League policy! Our 10,000 League guys and gals represent nearly 10% of the League membership and many of them don't vote so, ya know we gotta be important! See if ya can find a guy that (1) has a genuine interest in us hams and can be trusted, (2) knows ham radio, (3) is a skilled operator, (4) knows the aims and purposes of the League, (5) will state his convictions and fight for them, (6) won't be swayed by power political groups, (7) will respect the views of us division guys, (8) will keep us informed of the "goings on," (9) isn't a blind follower and (10) is willing to take on a job of doggone long hours and fair-to-middlin' hard work! If you think one of the kids that's runnin' fits the bill then for cryin' out loud, spend the 4¢ ta vote for 'em! It only comes about now and then so get out and vote. Net certificates were issued to Exemplars of the following nets: Kings County 2-Meter AREC, K2OVN, WA2ZCU; the NYCLIPN, WA2QJU, WA2VZN, WA2PJL, WB2-HWB, WB2DCG, WB2IQG, WB2HLM, WA2PXL, WB2-ISW. The following are Gold Star Charter members of the NYSC Net: WA2RUE, WA2VIK, WB2HMS and WA2UWA. Appointments: WB2EUH, WB2IQG, WA2-UWA as ORSs; WB2HLM, WB2IQG as OPSs; W2UOQ as OBS and OES. K2UHD, WA2TAQ and WA2BIT received Public Service Awards for meritorious service in the Alaska earthquake emergency. If anyone else received such awards, please inform me so that I can let the rest of the folks know! Rockaway ARC is holdin' another one of the "popular" auctions Oct. 23 at 8 P.M. at Legion Hall, 301 Beach 92nd St., Rockaway Beach! WA2RUE now belongs to CHC. Besides knowing what to do with all that traffic she handles WA2GPT has an OM (pssst-Harry) who runs a jim-dandy barbecue! So, while he charbroils 'em, she checks into the new N.Y. State Post Office Net! WB2IQG has a 10-meter traffic link with WA2YLL, WB2CRL and WA2-PJL. W2GKZ has a new Rohn tower and is walloping NLI, 2RN and EAN! WA2EXP and K2LCK made 100 contacts on 6/2 while portable on Mt. Equinox, Vt. K2GNR has a new SR-150 and TA-33, but WA2VGK has a brand-new harmonic. WA2PMW figures he's grabbed the first Michigan Counties Award in N.Y.C. Look out! WB2AWX got a driver's license. K2KYS has a new Viking V.F.O. Adventurer. K2SJP's new antenna is the terrace rail of a 19-story co-op driven by a Knight T-150A and a home-brew matchbox. W2VTA made Extra Class! The Mid-Island ARC has resumed publiation of *Feedback* and is looking for 6-meter mobileers, according to WB2GAG. W2JTP reports that the section 2-meter t.m. groups led by WA2PZMM (N.Y.C.), K2JLE (Nassau) and W2OQI (Suffolk) met to select working channels secondary to the National Calling Channel to reduce congestion. They also are planning repeater stations. The annual NLI Picnic met with much success at WA2RUE's QTH despite a thundershower. The N.N.J. gang, led by their intrepid SCM, sailed from N.J. at sunrise on WA2GQX's boat and arrived at sundown after a trek across the Island by bus and wagon. In the meantime, all were regaled with K2DKK's inimitable ability to consume the edibles. Traffic: (July) WA2RUE 1096, WA2GPT 530, W2EW 271, WA2QJU 185, WB2HLM 159, WB2EUH 154, WB2-IQG 137, WA2PJL 130, WA2VLK 120, WA2UWA 117, K2US 103, WB2HWB 76, W2GKZ 70, WA2LJS 42, WB2-LUK 41, W2DBQ 39, WA2EXP 30, WA2PMW 30, W4-TRU/2 29, W2EC 21, WA2RMP 9, W2PF 4, WB2AWX 3, K2KYS 1. (June) WA2VLK 246, K2JSP 14, WA2RMP 12, WA2UYQ 10.

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. ExSun.		W2PEV-PAM
NJ Phone	3900 kc. 9:00 A.M. Sundays		W2PEV-PAM
NJ 6&2	51,150 kc. 11:00 P.M. M-W-Sat.		K2VNL-PAM
NJ 6&2	146,700 kc. 10:00 P.M. Tu-Sat.		K2VNL-PAM
NJNN*	3725 kc. 7:20 P.M. MTWTh		WA2SRK-RM

*Novice and Slow Speed. All times local. AREC net sked information is available from John W Banke, K2ZFI, SEC. New appointments: WN2MAJ as OES. Congratulations to WB2KXG and WA2UUQ on the receipt of their General Class licenses. The Middletown Emergency Net meets Fri. at 9 P.M. (Correction of sked in Aug. QST). WB2ALF is working DX with a new 40-meter Vee. WB2HLH has installed push-to-talk. WB2JWB is NCS for the TCRN 1200 to 1300 GMT

(*Continued on page 126*)

NOW

DIRECT CRYSTAL CONTROL TO 160 mc With AOC Plug-In Transistor Oscillators

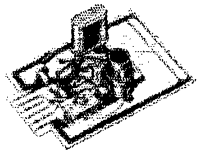
- Portable Signal Standards
- Signal Generators For Receiver Alignment
- Band Edge Markers
- Frequency Markers For Oscilloscopes
- Quick-Change Plug-In Oscillators
- Accessory Cases

HIGH FREQUENCY (20 mc – 160 mc)

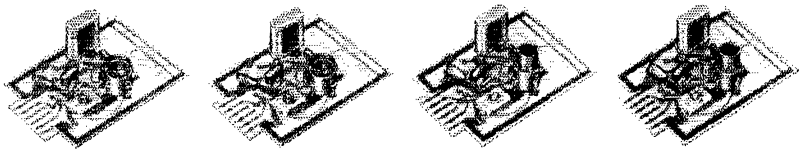
Five transistor oscillators covering 20 mc - 160 mc. Standard 77°F calibration tolerance ±.0025%. The frequency tolerance is ±.0035%. Oscillator output is .2 volts (min) across 51 ohms. Power requirement: 9 vdc @ 10 ma. max.

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.

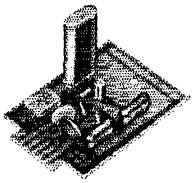


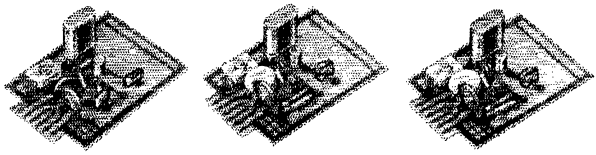
LOW FREQUENCY (70 kc – 20,000 kc)

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



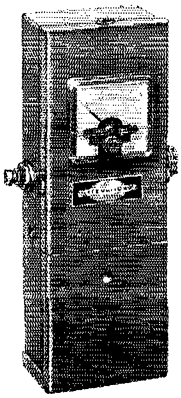


INTERNATIONAL CRYSTAL MFG. CO., INC.

18 NORTH LEE OKLAHOMA CITY, OKLA.

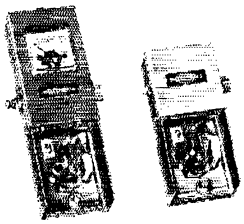
AOC OSCILLATOR CASES

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**

daily on 7042 kc. WA2KRC is president of his class at Rutgers U. K2ZFI has been on the road recruiting for AREC. WB2GFY has installed a new quad antenna. WB2IIJW has a new 75-meter antenna. WN2KLD now has 15 elements at 45 feet on 2 meters. WN2KDD reports on a strictly Novice FD group—WN2IKW, WN2MTN, WN2LVW, WN2KDD and WN2KGE. K2IBF has a new 2-meter beam. WA2ZOW built an 807 modulator for the 6-meter rig. The Scotch Plains C.D. Net meets at 2000 on 146.8 Mc. Thurs. W2COT worked 26 states and 4 countries while mobiling this summer. The South Amboy ARA Net now meets at 2100 on 145.65 Mc. Tue. WA2VID and W2ZAL are now regular members of the NYC-LI 2-Meter Phone Net, providing a New Jersey connection. WB2BCS and W2MPT are building 2 complete 432-Mc. TV stations. WA2AXV has 30 watts and a ten-element beam on 220 Mc. WB2GKF is working on 6- and 2-meter equipment and will attempt moon bounce transmission. W2CVW is installing 2- and 6-meter converters. A very pleasant gathering of NJN members and families took place at the QTH of WA2GQZ on Aug. 2. WA2GQZ, WA2GQI, WB2ALF, WA2UOO, W2CVW, WA2NYU and associates "Bobbie and Eddie" attended the NLI Net Picnic at the QTH of WA2RUE after an arduous trip by boat and bus. SEC K2ZFI reports 552 full members and 42 emergency nets in the NNJ AREC. Attention AREC members and ECs: Get oiled up for the Simulated Emergency Test Oct. 3 and 4. Prospective ECs and AREC members: This is a good time to sign up and get your feet wet. The Pre-SET and SET are designed to train new personnel as well as to provide an exercise for the experienced personnel. RMs and PAMs should also get ready, for NTS will be working with AREC under the Amateur Radio Public Service Corps. Traffic: (July) WB2ALF 418, K2VNL 252, WB2AEJ 165, WA2VID 146, K2UCV 134, WA2MYB 122, WB2HLIJ 95, WA2SRK 89, WA2UOO 57, W2PEV 56, WB2JWB 52, WB2KXG 34, WB2GFV 26, WA2KRC 25, WA2TBS 24, WA2KVQ 22, WA2WAJ 18, W2CVW 17, WA2CCF 16, K2ZFI 16, WB2GFY 13, WB2IIJW 12, W2DRV 11, W2BVE 10, W2TFM 9, W2ZAL 9, WA2TWS 7, K2ACJ 6, WB2BCS 6, W2NAK 5, K2EQP 3, WB2ICH 3, WN2KLD 2, WB2DEP 1, W2EWZ 1, W2VMX 1, K2VVL 1. (June) W2CVW 61, WN2KDD 3.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØUSL. PAMs: KØBBL, WØLSF. New officers of the Quad Counties AREC are KØJVI, NCS and pres.; KØLXL, vice-pres.; KØZKU, secy.-treas.; WAØAMX and KØYTO, programs; KØJVJ pub. Get set for the SET. Let's do it again this year and I will help by getting all the reports in to Headquarters. Our SEC spent the summer in Minnesota but is back to work and busier than ever. The S.S.B. Camper Crowd has had the biggest summer ever. WØOLM is making a fine recovery from last year's coronary; likewise WØKJN. KØTCZ has been commuting 70 miles a week between his two homes. Seventy years do not seem to bother him a bit as he modestly says, "Right living pays off." Tom and Bertha Willits, John Ferrell and the Wests, Marian and Cliff, were all Minnesota visitors during the summer. The SCM has a new vertical, thanks to son WØMEL, and hopes to have a fine working SX-88, thanks to the combined efforts of WAØDOK and WØMMZ. We had to miss the picnics this year and sure missed the "eyeballs" and the rest of the fine fellowship that goes with amateur radio. Net reports: Interstate S.S.B., QNI 706, QTC 168 sessions 31. 75-Meter Phone, QNI 1020, QTC 59, sessions 27. 160-Meter Fone, QNI 464, QTC 0, sessions 31. Hamilton County, QNI 93, QTC 0, sessions 27. Traffic: WØBDR 1734, WØLGG 1155, WØUSL 104, WØNTB 97, KØQKD 17, WØBLH 14, WØYDV 14, KØKAQ 12, WAØEYJ 7, WØQVZ 6, KØTDO 3, WØGPL 2.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. RM: WØSAF. PAM: KØEFL. V.H.F. PAMs: KØVHP, WØHAJ. Currently-appointed OOs are WØPKD, WØBYV, WØYZB, WØALA, WØVBK, WØBMW, WØDEL, WØWYK, WØPFG and KØBXF. Following is the report of nets for July:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave.
KPN	3920	1245Z	M-W-F	16	18	219	13.7

NCSs: WØORB and KØEFL.

KPN	3920	1400Z	Sun.
QKS	3610	0030Z	Daily

Congratulations go to the Emporia Amateur Radio Club for a fine workout on Field Day. This club not only made a good total but carried off the SCM Trophy for the top club in Kansas. The Tech-Ni-Chat Club of Wichita ran second with the Jayhawk Amateur Radio Society pulling up in third place. To the other clubs, better luck next year when your SCM again will offer a distinctive trophy to the club running up the largest Field Day score. We have room for some c.w. operators

(Continued on page 128)

406-470 Mc
3.5 db

OMNIDIRECTIONAL VEHICULAR ROOF TOP ANTENNA

Cat. No. 381-509

- 20.0 Mc Bandwith at 460 Mc
- 3.5 db Omnidirectional Gain
- 1.5:1 VSWR
- 75 Watt Rating
- Only 28½" High at 460 Mc
- Spring Temper Stainless Steel Elements and Spring
- Mounts in ⅜" Diameter Hole

Models are available without mounting base to fit all popular antenna bases presently installed on vehicles. Simply remove present ¼ wave whip and replace it with this collinear array...and more than double your mobile system gain.

GAIN 11.5 db IN SYSTEM PERFORMANCE

406-470 Mc
8.0 db

OMNIDIRECTIONAL BASE STATION GAIN ANTENNA

Cat. No. 458-509

- 8.0 db Omnidirectional Gain
- 1.5:1 VSWR
- 250 Watt Rating
- 14 ft. Overall length at 460 Mc
- 20.0 Mc Bandwidth at 460 Mc
- 2⅜" dia. Support Pipe
- ⅞" dia. Foam Dielectric Internal Feed Line
- Weight 29 lbs. at 460 Mc

This collinear array consists of six ½ wavelength elements mounted .81 wavelengths apart and fed inphase. Lightning protection is provided by a stainless steel spike at the top of the fiberglass housing connected to the support pipe at the base by a ⅞" conductor.

Communication Products Company
DIVISION OF
PHELPS DODGE ELECTRONIC PRODUCTS
CORPORATION

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on the QKS Net. Those who can give of a little time to keep traffic moving should contact WØSAF. Traffic: (July) KØGII 88, KØYGR 28, KØBXF 21, WAØCCW 18, KØLHF 10, KØVQC 9, WØALA 6, KØGQO 5. (June) WØPKD 2.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. RMs: WØOUD, KØONK. PAMs: WØBIL, WØBVL, WØOMM. The following appointments were renewed for another year: WØCWT as EC for Bates, Cedar, Hickory, St. Clair and Vernon Counties; KØQCQ as ORS; KØFPC as ORS; KØONK as RM. The Mo. Slow Speed Net (MSN) has been reactivated on 3715 kc. at 9 P.M. CST. All who want to learn traffic work and increase their code speed are invited to check in. The net operates at 5 to 10 w.p.m. WØRTW was featured in the second edition of *Mo. Net News*. WØOUD operated as NCS of SMN on emergency power when the power failed one Sunday. KØVNB has a new NCX-3. WØFHV has a new TR-3. The ARPSC Bulletin of July 6 shows that Mo. came up from 29th to rank 12th in section traffic for 1963. This represents a lot of good operating by Mo. traffic-handlers. If you handle any traffic at all, count it up and send the SCM a radiogram or mail a report on the 1st of the month. Let's keep up the good work. WØGQR reports 4 drills for Mo. Dist. 1 AREC net with 24 check-ins. From the reports the Washington, Mo., Hamfest was enjoyed by all who attended. Net reports for July:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	Mgr.
MEN	3885	2345Z	M-W-F	14	293	92	WØBUL
MON	3580	0100Z	Tu-Sun.	27	184	174	WØOUD
MNN	3580	1900Z	M-Sat.	27	106	40	WØOUD
SMN	3580	2200Z	Sun.	4	19	3	WØOUD
MSN	3715	0300Z	Daily	—	—	—	KØONK

Traffic: KØONK 1839, KØFPC 400, WAØEAIX 188, WØOUD 87, KØLQH 58, KØAEM 45, WØTPK 40, WAØCWV 37, WØZLN 33, WAØJKJ 31, KØBWE 29, KØEQY 26, WØBUL 18, WØRTO 18, WØKIK 17, WØOGC 12, WØBVL 3.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. July net reports: AREC Net, WØIRZ, QNI 87, QTC 1. Nebr. Emer. Phone Net, WØFIG, QNI 1016, QTC 83. Morning Phone Net, QNI 512, QTC 56. KØUWK, net manager, reports the net moved to 3982.5 kc. Aug. 1. Nebr. C.W. Net (NEB), 0100Z session, QNI 184, QTC 27; 0400Z session, QNI 80, QTC 25. West Nbr. Phone Net, WØNIK, QNI 539, QTC 27. Nebr. Storm Net (2 sessions), KØJXN, QNI 978, QTC 11. Daily Nebraska nets are: 3982.5 kc., 1330, 1830, 0130 GMT phone. The early session of the Storm Net will start Oct. 1 at 2330Z on 3850 kc., net meets daily at 1400Z. The Sun. AREC Net meets at 1430Z on 3982.5 kc. The AREC calling and emergency frequency is 3982.5-kc. l.s.b. for long haul and 28.6-Mc. u.s.b. for short haul. Emphasis on AREC nets is being placed on 10, 6 and 2 meters. All are urged to contact their local ECs for details. Appointments: WØVQR, WØCXH, KØTSU and KØWPF as ECs. Traffic: (July) WAØBYK 114, KØYDS 105, WØFIG 34, KØDGW 31, WØFQB 24, KØHNT 21, KØJFN 20, KØKJP 19, WØZHV 14, WØGGP 13, WØDDT 12, WAØEGK 12, KØUWK 12, WØAES 5, WØEGQ 5, WAØDFS 4, KØHJY 3, WØHOP 3, WØNOW 3, WAØERN 2, WØLJO 2, WØNIK 1, KØONH 1, WØYFR 1. (June) WØLOD 230.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Robert J. O'Neill, W1FHP—SEC: W1EKJ. RM: K1GGG. H.F. PAM: W1YBH. Traffic nets: CN, the Connecticut Nut Meg Net, 3640 kc. daily at 1845. CPN, the Connecticut Phone Net, 3880 kc. Mon. through Sat. at 1800 and Sun. at 1000, same frequency. Connecticut Emergency Coordinators Net, Sun. at 0900 on 3880 kc. Traffic reports: CPN, 31 sessions, 135 messages, average attendance 14 stations, high QNI to W1YXB, W1LUH, K1OQG, K1OJZ/1, W1YBH, K1YTG, EIC, YIX. Bad band conditions were noted by the manager. CN, 31 sessions with 179 messages, average attendance of 10.8 stations and 5.9 messages. High QNI to W1RFJ, K1EIR, K1WKK. Certificate endorsements went to the following stations: K1RTS as OES, W1QV as OBS, K1GGG as ORS, W1QV as OPS. New appointment: K1QNF as OES. New club officers of the Shoreline Amateur Radio Club are K1PQL, pres.; K1ILJ, vice-pres.; K1OCQ, jr. vice-pres.; K1VII, secy.; K1VEA, treas. The Norwich AREC group held an outing at Lantern Hill with a total of 41 persons counting 14 amateurs, guests and family members. W1BGD completed the SB-300 and it works like a charm. The Norwich boys will hold net procedure sessions in the fall months. The Candlewood ARC holds meetings the 2nd Fri. of the month. Fewer OES reports were received for the summer months. Only two OO reports were received in July. Yours truly made a very nice motoring trip to the Southland, but worked

(Continued on page 130)

from 2 to 160 meters

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for the BEST
in HF and VHF
listening

HAMMARLUND'S NEW HQ-170A-VHF

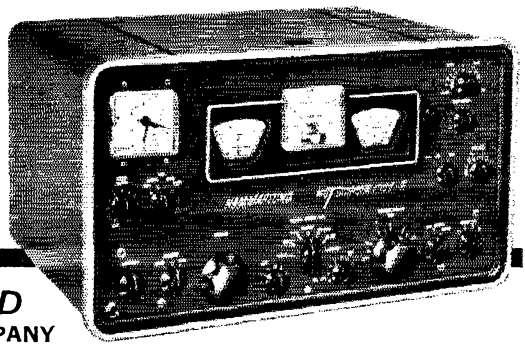
the only receiver capturing all popular Ham Bands.*

The exciting HQ-170A-VHF is the **first** and only Ham Band receiver that gives you **everything** you want. Separate NuVistor front ends (0.3μV for 10 db S/N) for both 6 and 2 meters completely eliminates the need for add-on converters or jury-rigged adaptations. Built-in 6 and 2 meter operation employs **matched circuitry** for outstanding performance.

Here is an SSB receiver that combines basic operating excellence with all of the extra features you want to make it a versatile, "fun-to-work-with" unit. Full coverage from 2 to 160 meters, excellent electrical and mechanical stability, expanded vernier tuning and a host of truly incomparable HQ-170A features makes this receiver the new **First Choice** for the amateur fraternity.

The HQ-170A-VHF is the most versatile, and most **complete** amateur band receiver now available on the market—one neat package contains all the flexibility you need—superlative AM, CW and SSB reception on **All** popular amateur bands.

Coming soon—Matching transmit accessories for the Fabulous HX-50.



*Except for the Hammarlund HQ-110A-VHF

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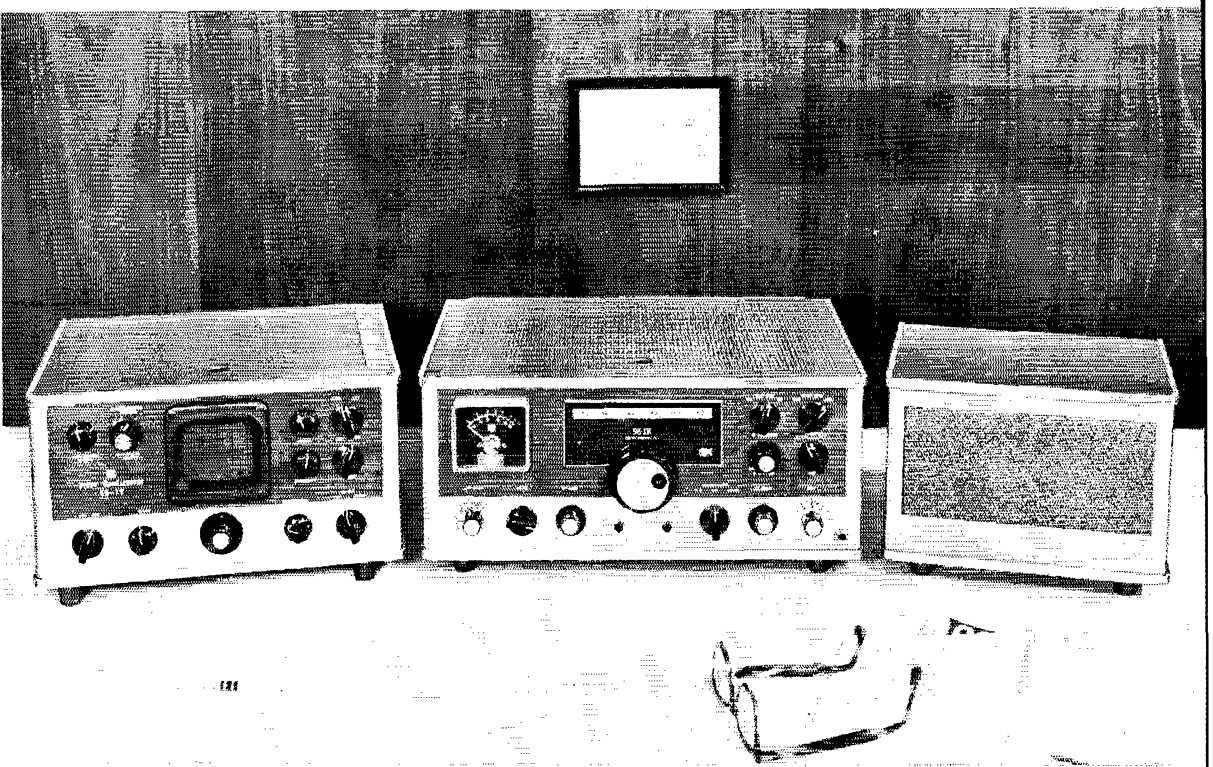
only on 6 and 2 meters and made no contacts from Skyline Drive, Va., at 4000 ft. elevation. The Carolina hills gave a few nice contacts about one hundred miles away from Mount Airy and the Blue Ridge Mountains on N. Car. and Va. Traffic: (July) K1WKK 255, K1EIC 251, K1LFW 167, K1PGQ 167, K1YIX 147, K1DQC 123, K1EIR 119, K1UYZ 94, W1BGD 92, K1ZND 75, W1FHP 58, W1CTI 31, K1PLR/3 22, W1YBH 21, K1-OJZ/1 13. W1BNB 10, W1ZFM 10. W1CUH 9, K1OQG 9, W1OBR 8, W1QV 8. (June) K1LFW 125, K1PQS 39.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr. W1ALP—W1AOG, our SEC, received a report from W1STX, Needham EC. New appointments: K1-VPJ as OBS, W1THT as OO, WA2UFI/1 as ORS. W1-AKY had quite a trip to Sweden. SM5BNB is here on a trip. W1LES made the BPL in June. The EM10MN Net held 10 sessions with 39 QNIs, 18 traffic in June. W1-HIL has a new HT-37. K1PPP reports the Central N.E. Net had 27 sessions, 750 QNIs, 5 traffic. W1AUQ had a direct hit by lightning. K2LLA, who goes to N.U., says he lost all his ham gear in a fire in Boston. W1DEL is getting married and moving to Holbrook. K1OWK is on 75. W1AA is heard on 2. W1DXN has 100 watts mobile on 6. W1BGW is on 160 c.w. some. The 1965 New England Div. Convention will be held Apr. 24-25 at Swampscott. W1ALP spoke at the Whitman Club. New officers of the Middlesex ARC: K1SNP, pres.: K1YVY, vice-pres.: K1OGA, secy.; K1TWV, treas. WA1AMI is on 40 and mobile and has an NCX-3. W1-VAH has an inverted "V" for 80. The N.E. Emergency Phone Net meets on 3870 kc. Sun. at 9 A.M. with W1HPV as manager. W1AYG has an HW-22 for 40 and is on 2-meter s.s.b. K1PNB is taking it easy after an operation. We hope to hear from some of the Novices. There were 87 new ones in this section alone in the past month. Our Novice Net is for you and the fellows are trying to help you with your code and traffic-handling. K1WYS is in the Air Force at San Antonio, Tex. WN1-AVT is on 15 c.w. and building a beam. New officers of the Chelmsford ARA: K1SAU, pres.; K1OKE, vice-pres.; K1TEE, secy.-treas. WN1CAM is on 40-80 c.w. W1NF has retired from the Boston Navy Yard, and the boys gave him an RCA AR8503 receiver. Best of luck and health to you. K1ZAC is on 6. K1VOK's new job will be on the 2nd shift. W1KTJ is working the Novices on 80 c.w. W1LXR lost his antennas in a lightning storm. W1ANO is co-pilot for W1HXK. W1ZLX and WA1AAO are going on an expedition to Dukes and Nantucket Counties, Oct. 17-18 at Martha's Vineyard, Oct. 24-25 at Nantucket. They will be on 7040 with 7035-37 as alternate frequency and on 7160 for the Novices. Contact W1ZLX. WN1BOX is on 40-80 c.w. and 2. K1-ONW has a Viking 2 and is building a keyer and a v.f.o. K1DZG, our Somerville EC, took in one general alarm fire in liaison with the Red Cross. K1VPJ is in the Crossband and Post Office Net on 6. The following provided communications for the NEAAU Road Race: W1STX, K1VPJ, K1EZX, K1ZKK, K1NUD, K1OQQ, W1OOP, all members of the Needham AREC. K1OWK reports that our EM1OMN held 5 sessions, 31 QNIs, no traffic. Our Novice Net, on 3733 kc., held 12 sessions, 39 QNIs, 8 traffic. New stations: WN1CDW, K1QHG, K1YTI. K1WJD has an HT-32 and an HT-33A. W1-AUQ is ragchewing on c.w. The EM2MN held 23 sessions, 175 QNIs, 150 traffic. The 6-Meter Crossband Net had 23 sessions, 306 QNIs, 12 traffic. K1BGK is looking for QSOs on 220 Mc. K1ESG is working on the code and thinks he can copy over 50 w.p.m. K1CMS/K1-ILA is going to Mexico and mobile and has a new Telrex 1147 beam. W1NF gets on the Morse Net on 3510 kc. daily at 8 A.M. WA2UFI/1 is working on an ARC-5 for 160. WA1BGD is a new OES. WA1AXB is on many bands. Appointments endorsed: W1s SVU, ACB, BGW, as OOs; W1UIR as OBS; K1SRZ as OES. Traffic: (July) W1PEX 1151, W1OFK 220, W1EMG 140, K1ESG 130, WA2UFI 129, W1ZLX 75, W1DOM 39, K1PNB 38, K1WJD 36, W1EAE 34, K1LCQ 27, W1BJE 24, K1VPJ 24, W1AOG 20, K1FJM 20, K1GKA 12, K1BGK 8, K1-ONW 8, K1VOK 8, W1AUQ 4, W1RST 4, K1CMS 3, W1HXK 2. (June) K1WJD 46, K1YKT 28, WN1AVT 4, K1CMS 4, K1OWK 2.

MAINE—SCM, Arthur J. Brymer, W1AHM—SEC: K1DYG, PAM: K1ADY, RM: K1MZB. Traffic nets: Phone—The Seagull Net meets on 3940 kc. at 1700-1800 daily and 2000-2100 daily except Sun. Maine State C.D. Net meets Sun. at 1100 EDT on 3993 kc. and Wed. on 3530 kc. at 1900 EDT with K1BYK as NCS. The AREC Net meets Sun. at 0900 EDT on 3940 kc. with K1DYG as NCS. C.W.—The Pinetree Net meets daily at 1900 EDT on 3596 kc. Mon. through Sat. First Regional Net meets at 1815 to 1930 daily on 3605 kc. The Pinetree Net would like many more people to check in as it is always the same people who check in. I am sure that a lot of hams in the Maine area *need* some c.w. practice, including myself. K1NAN now has RTTY installed at that facility. The station was off the air most of July moving and installing a new kw., etc., but is back in busi-

(Continued on page 132)

SS-1R, SS-1S, SS-1T, SS-1TF.....



THE SQUIRES-SANDERS family of HF amateur equipment—which started with the announcement last fall of a genuinely new approach to HF receiver design and performance (SS-1R) and original developments in noise silencing techniques (SS-1S) continues to grow. The original objective of a complete HF amateur *system* which is unsurpassed in quality and performance will soon be realized. The SS-1R receiver, SS-1RS matching speaker, and SS-1S noise silencer are currently available. The superb performance of this receiver and silencer—especially in frequency accuracy, rejection of strong adjacent signals, and the spectacular elimination of impulse noise (plus really fine construction)—has been talked about by hams the world over.

The SS-1V Video Bandscanner (see photo, left) is just as unusual as its predecessors. This unique oscilloscope display unit, when used with the SS-1R, shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the *signals displayed do not move as the receiver is tuned*, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier. In addition provision is made for transmitter monitoring or analysis with automatic switching on "transmit."

The matching transmitter—SS-1T—has been released for production also and will be available shortly after the Bandscanner. Designed for transceive mode operation with SS-1R receiver frequency control, SS-1T will operate at 200 watts PEP input and will embody still other unusual Squires-Sanders developments which provide operating features not available in similar equipment. Complete specifications and operating characteristics will be published shortly. For those operators who prefer separate receiver/transmit frequency control, the separate transmit frequency unit (SS-1TF) will be available. Keep in touch with your distributor or write for further detail.

AMATEUR NET PRICES: SS-1R Receiver, $895; SS-1RS Speaker, $35; SS-1S Noise Silencer, $135; other prices to be announced.

Squires-Sanders, Inc.

MARTINSVILLE ROAD (LIBERTY CORNER), MILLINGTON, N.J. • 201-647-3200

ness now. The Kenebec AREC Net will be back in operation in the fall, maybe by the time this reaches the members in the state. I don't know how much longer I will be your SCM for I have the QTH up for sale and am moving South where it is warm. I am in correspondence with several hams for the job but have no one yet for it. Traffic: K0KPU/1 87, K4BSS/1 71, K1TEV 28, K1ERI 23, K1MDM 14, K1NAN 8, W1OTQ/1 8.

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—The Granite State Phone Net meets on 3842 kc. (alt. freq. 3845 kc.) Mon. through Fri. at 2330Z and Sun. at 1430Z. Congratulations are extended to the nominees for SCM: W1SWX and W1YHF. K1CXP reports that his new call from Connecticut is W1BHV and Bob has been awarded Certificate No. 1, Penna. Counties Award, Class A, for having worked all 67 Pennsylvania Counties. K1CXP/W1BHV soon will be on the air from Connecticut. K1DWK reports NCSs for Merrimack Valley Emergency Net: For June, K1DWK; July, K1SEJ; Aug. K1RCY. This is a fine net and support is deserved. The Contoocook Valley Radio Club operated FD with 6 complete setups and 14 operators. This club meets the 3rd Mon. of each month and all visitors are welcome. The new officers are K1OXO, pres.; W1JXZ, vice-pres.; K1VWM, treas.; and K1BGI, secy. K1BGI continues to be one of the few c.w. men handling traffic with the Vermont Traffic Net. We welcome WN1CAJ to the AREC. K1NBN operated in the CD Party with a fine c.w. contact score of over 100,000 points. No OO reports were mailed by K1NBN for the month of July.

FIFTEENTH NEW HAMPSHIRE QSO PARTY

October 31-November 1, 1964

The Nashua Mike and Key Club, W1TA, announce their sponsorship of the Fifteenth New Hampshire QSO Party, and cordially invite all interested radio amateurs to participate. Here are the details:

(1). Contest period: 0000 GMT to 0400 GMT and 1200 GMT to 1600 GMT Sunday, Nov. 1 and 0000 GMT to 0400 GMT Monday, Nov. 2.

(2) No power restrictions.

(3) Scoring: N. H. stations count 1 point for each N. H. contact, plus 2 points per outside contact; stations outside the state count 2 points per N. H. contact; both multiply by the number of counties worked (10 maximum).

(4) Engraved certificates will be issued to all participants reporting, with special endorsements for the highest-scoring stations, both in N. H. and outside, in the phone and c.w. categories. Single operator stations only are eligible for the special endorsements.

(5) The same station may be worked for additional credit on more than one band, phone or c.w. Bands will be 160 to 10 and suggested frequencies are 1815 3530 3842 7030 7220 14,100 14,250 21,100 21,350 28,100 and 28,800 kc.

(6) General call: "CQ NH" on c.w.; "CQ NH QSO Party" on phone. N. H. stations are requested to sign *de W1—NH K*.

(7) Contact information required: Report and QTH (including county of N. H. stations) and number of QSO. Those operators participating in both the c.w. and phone categories must submit separate logs for each mode of operation. Each log shall be scored separately based on the number of contacts and counties worked in each mode. Logs and scores must be postmarked not later than Nov. 25, 1964, and should be mailed to the Nashua Mike and Key Club, P.O. Box 94, Nashua, N. H.

(8) The WNH (Worked New Hampshire) certificates will be awarded to stations working all ten counties during this QSO Party, participating logs confirming. Detailed requirements for the WNH certificate, a standing award, may be obtained by writing the Concord Brasspounders, Box 339, Concord, N. H.

(9) The Granite State Award may likewise be obtained, details from the Nashua Mike and Key Club.

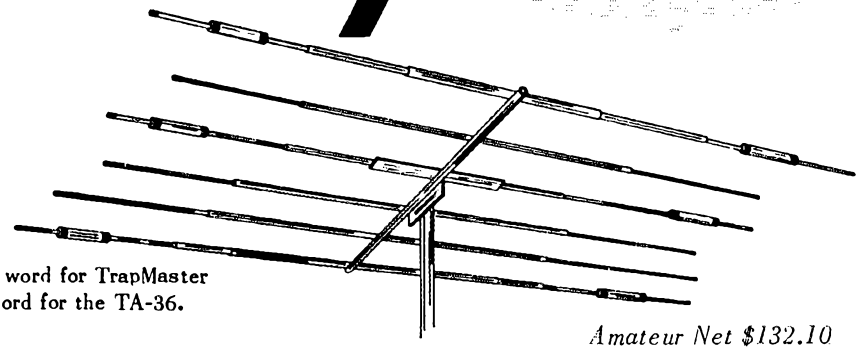
RHODE ISLAND—SCM, John E. Johnson, K1AAV —SEC: W1YNE. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. New appointments: K1TPK as V.H.F. PAM, W1VWR as EC. RIN report: 23 sessions, 92 QNI, 36 traffic. RISPN report: 31 sessions, 576 QNI, 89 traffic. The R.I. Emergency Net meets Mon. at 2000 local time on 51.5 Mc. The NCRC Club of Newport

(*Continued on page 134*)

Mosley

MODEL TA-36

for 10-15-20 meters



Incomparable is the word for TrapMaster and terrific is the word for the TA-36.

Amateur Net $132.10

The new clean-line TA-36 . . . the three band beam that will give your signal that DX punch!

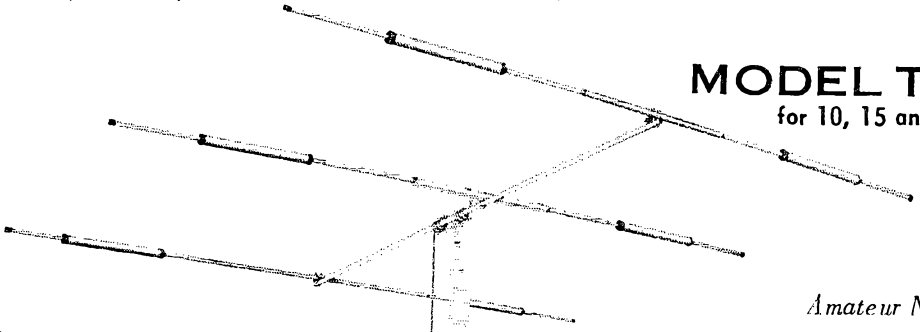
This wide spaced, six element configuration employs 4 operating elements on 10 meters, 3 operating elements on 15 meters and 3 operating elements on 20 meters.

Automatic bandswitching is accomplished by means of exclusive design high impedance, parallel resonant "Trap Circuits". Built for operation at maximum legal amateur power.

Traps are weather and dirt proof offering frequency stability under all weather conditions. Just one coaxial feed line is needed. 52 ohm, RG-8/U is recommended.

Antenna comes complete with illustrated instruction booklet and color coded elements for ease of assembly.

SPECIFICATIONS and PERFORMANCE DATA: Forward gain on 10 meters is 9 db., on 15 meters is 8.5 db. and on 20 meters is 8 db. Front-to-back is 20 db. or better on all three bands. SWR is 1.5/1 or better at resonance. Transmission line - 52 ohm coaxial. Maximum element length is 29 feet. Boom length is 24 feet. Turning radius is 19' 3". Assembled weight is 69 pounds. Wind load (EIA Standard) is 210.1 pounds. Wind surface area is 10.7 square feet.



MODEL TA-33

for 10, 15 and 20 meters.

Amateur Net $104.75

Three element beam provides outstanding performance on 10, 15 and 20 meters. Exceptionally broadband for excellent results over full Ham bandwidth. Exclusive MOSLEY trap design provides resonant frequency stability under all weather conditions. Easily handles full KW, amplitude modulated. Traps enclosed in aluminum are weather and dirt proof. Element center sections of double thickness 6061-T6 aluminum to reduce sag. Boom requires no bracing. Heavy duty universal mounting plate fits masts up to 1½" OD. Feed with one coax line. RG-8/U is recommended.

SPECIFICATIONS and DATA: Fwd. gain up to 8 db. Front-to-back is 25 db. SWR is 1.1/1 or less, at resonant frequencies. Maximum element length is 28 feet. Boom length is 14 feet. Turning radius is 15.5 feet. Assembled weight is 40 pounds. Wind surface area is 5.7 square feet. Wind load is 114 pounds. Shipping weight is 53 pounds.

MOSLEY Electronics Inc., 4610 N. Lindbergh Blvd., Bridgeton, Mo., 63044.

will hold an auction Mon., Oct. 26, at 1930. It will be held at the Seamans Institute in Newport and W1TXL will be the auctioneer. The RISPN held its annual meeting with the following officers elected: K1NJT, net mgr.; K1AUN, asst. mgr.; K1FGK, goodwill chairman. The W1AQ Club of Rumford held its Annual Family Day at Diamond Hill with several members and families present. The club announced the issuing of the following WRI certificates: No. 50 to K1UNM, No. 51 to W8WUT and No. 52 to WA1BJS. During the recent painting of the club, W1LFW stepped on a nail and had to be retired as a painter. K1EWL has just completed the new 80-meter dipole for his rig and says it works FB. WN1's CKL and CLI received their Novice Class tickets; K1FIO and WA1CLS received their Tech. class tickets. Traffic: W1BTV 154, W1TXL 149, K1TPK 91, W1VWR 62, W1BJS 49, K1VYC 37, W1YNE 36, K1RRK 20, W1YKQ 6, K1EWL 2.

VERMONT—SCM, E. Reginall Murray, K1MPN—RM: W1WFZ. The Green Mountain Net meets on 3855 kc. daily at 2130Z; the Vermont Fone Net on 3855 kc. Sun. at 1300Z; the Vermont Net on 3520 kc. Tue. and Thurs. at 2300Z; the Vermont C.D. RACES Net on 3993 kc. (a.m.) Sun at 1400Z. Welcome to new Novices WN1CBT and WN1CKH. Also congratulations to K1FSY and WA1CFO on getting their General Class licenses and to K1YJZ on getting his Conditional. Our RM, W1WFZ, passed the Amateur Extra exam at International Field Day in Burlington. With summer over, we hope to have increased activity in our various nets. We also need ECs. If interested, please get in touch with us. K1IJJ is working on a new antenna and kw. final. I am sure we missed some July traffic reports but will pick up the balance in next month's column. Traffic: K1YMZ 32, W1WFZ 26, K1MPN 11, W1JLF 6.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH. K1APR, C.W. RM: K1-IJV. 75-Meter PAM: K1RYT. Hampden County 10-Meter Traffic Net Manager: K1PKZ. June WMN report: Total number stations QNI 100; total traffic 72; active stations in order of attendance, K1YMS, K1IJV, W1-BVR, W1AMI, K1SSH, WA1AEV, W1DVW, K1LBR, K1ZBN, W1MND, W1ZPB, W1DWA, K1AEC and W1-QFJ. Activity was down considerably during July, but the net was in operation daily nevertheless. The following stations have reported into the Hampden County 10-Meter Traffic Net: WA1BQQ, W1UCB, W1BVR, K1-NIJ, K1PKZ, W1NRQ, K1ZKD, K1ZQB, K1RNH, K1-KBQ, W1KBV, W1CHG, K1FVU, K1IJV, W1NLE, K1-TGT, K1VKP, K1UFQ, W1ZER, W1GIV, WA1ABW, K1IYD and K1NJC. Now if they would just report in more often everything would be just FB! Very few reports were received this month, but this is to be expected during the summer. Let's get everything set for an active season ahead. Traffic: (July) W1BVR 117, K1SSH 70, K1LBB 27, W1DVW 5, WA1AEV 3. (June) K1IJV 83.

NORTHWESTERN DIVISION

ALASKA—SCM, Kenneth E. Koestler, KL7BZO—KL7EMA reports that a fire completely gutted and destroyed his radio shack, so he is off the air until further notice.

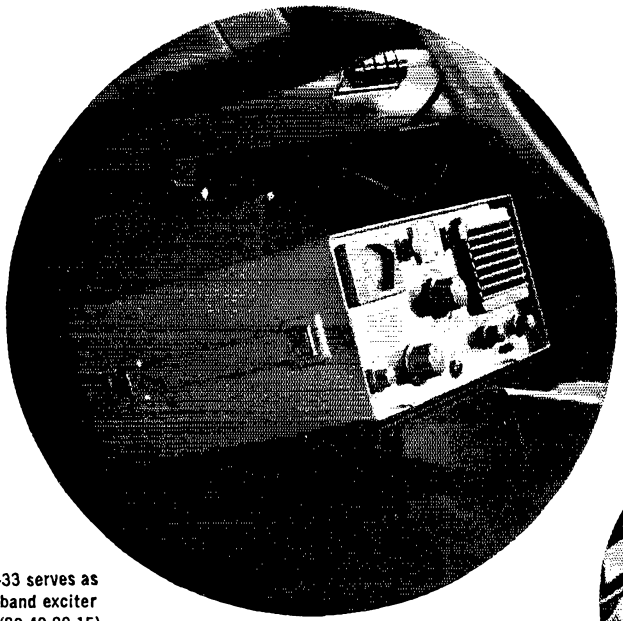
MONTANA—SCM/SEC, Walter R. Marten, W7KUH—Asst. SECM: Dr. Marvin Hash, W7YHS. L.F. PAM: W7YHS. V.H.F PAM: W7TYN RM: W7FIS I would like to take this opportunity to thank everyone who assisted me and for the fine cooperation received during my term as SCM. It has indeed been a pleasure to serve you as SCM. Please give your full support to the new SCM. K7PWY has organized the Montana Post Office Net. It meets Tue. at 1930 MST on 3890 kc. K7-EWZ moved into his new shack and made BPL for the month of June. W7ZAZ moved to Seattle. The Gallatin Amateur Radio Club held a potluck picnic. W7AYG and K7QBR were out-of-town visitors at this picnic. K7-RGI has a new HW-12. K7YXU has a new DC-60. K7-QLO is busy working on a homebrew s.s.b. rig for mobile use. W7EIP is building a power supply for his new TR-3. The Big Sky Radio Club (Great Falls) held a successful picnic at Kings Hill. K7VSS bought a new house. K7TGR toured the Johnson plant and picked up his new Viking s.s.b. adapter. W7HLH has a new 15-meter beam up and is running a new KWM transceiver. W7LBK visited W7KUH during his vacation trip. Very successful hamfests were held at Glacier Park and at Big Springs. Traffic: K7EWZ 142, W7NPV 7, K7UPH 5.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. Nets: OSN, 3585 kc. 6:30 P.M. daily. AREC, 3875 kc. 7:00 P.M. daily. Northwest Sidebanders, 3945 kc. 6:30 P.M. Mon. through Fri. K7IWD, manager of OSN, reports sessions 23, attendance 152, high 10; Traffic 96, high 10 average 4.17; BRAT Awards to W7BVH, W7JHA, W7ZFH and K7SGX, who is a new member and made BPL on originations this month. The Portland Roses and the Multnomah County Area AREC held a joint picnic at Blue Lake Park Sun.,

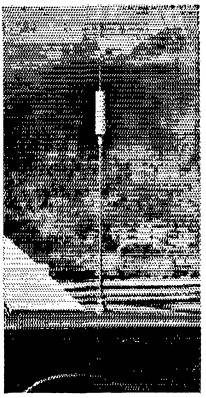
(*Continued on page 136*)

1000 WATTS..WITH WHEELS

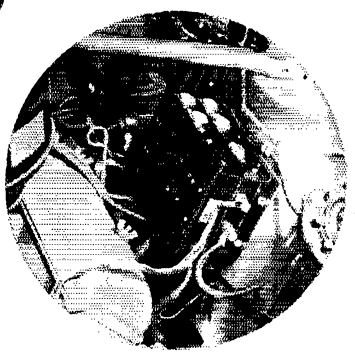
The mobile SSB kilowatt . . . once rare indeed, special and costly . . . becomes easy to achieve, and economical too using only standard SBE units. This is **advanced** equipment, sophisticated, in which transistors and diodes replace vacuum tubes in all low-level applications including the outstanding receiver. Current drain is reduced . . . **substantially.** Equipment size is scaled down materially. And these exclusive SBE transistorized designs reduce selling price by eliminating duplicate parts and wiring through the use of bi-lateral circuits that operate both during transmit and receive. Using these big-value items—SB-33 for the exciter and SB1-LA for the linear, a KW (p.e.p. input) fits handily into the family car . . . and space-wise, the family will never know the difference! See below how W6JPM did it.



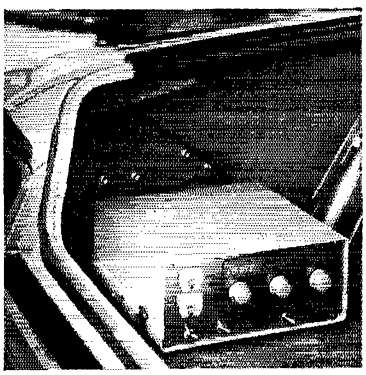
SB-33 serves as 4-band exciter (80-40-20-15) Note how little space it occupies



Band-spanner "top-sider" antenna with one of the new "gallon" coils, tops off this powerhouse on wheels.



Power supplies, SB2-DCP for SB-33 and SB-3DCP for SB1-LA are tucked into engine compartment.



The SB1-LA 4-band linear occupies modest space in a seldom-used corner of the rear trunk.

SB-33 . . . . . 389.50

SB1-LA 279.50

SBE

SIDEBAND ENGINEERS

317 Roebling Rd., So. San Francisco, Calif.

Please send SBE full-line catalog describing all units used in the mobile KW.

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July 26. Attendance was good with 30 licensed hams, 9 XYLs and 21 OMs present. A good time was had by all and the weather was perfect, very warm and bright. W7DEM reports on the Grants Pass area, K7PNT is on the air with a Valiant, K7YQM is using a "4-65" final; W7DEM, K7PMB, K7RDP and K7VMV are on mobile with Heath Twoers. K7KRE has received mention in the *Oregon Journal* about a Portland eye doctor doing cornea transplants in Samoa. He kept schedules with KS6BA to arrange shipment of refrigerated corneas via air express. How about your activities? Traffic: W7JHA 396, K7SGX 167, K7IWD 62, W7ZFH 56, W7MAO 15, W7DEM 7, K7DVK 4.

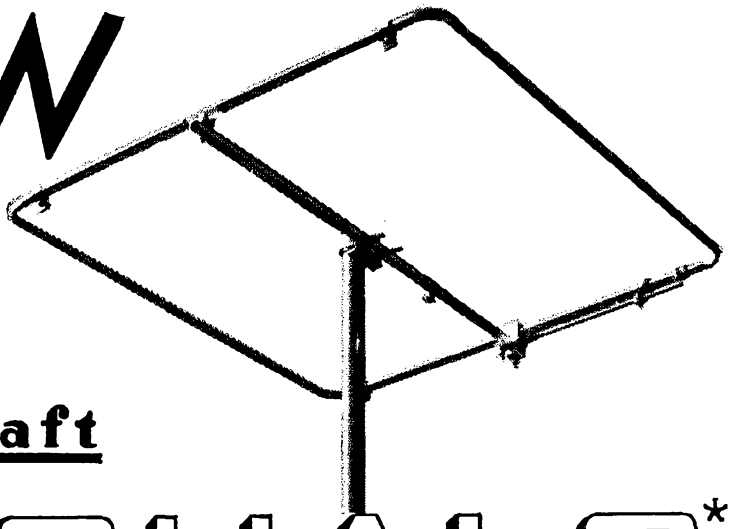
WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. Between 135 and 150 were in attendance at the WARTS Picnic held on July 11 and 12 at the American River Lodge. In attendance were the SCM, SEC and PAM of the section, along with some of the EC appointees from the different counties. W7LFA, Phone Activities Manager, reports that the Concomully Hamfest was attended by 135 amateurs plus their families. Norm says that he, W7REC, W7VPW and K7KXN are camping together almost every week end while attending these get-together meetings of the different hamtests and picnics. W7AIB, Route Manager, reports he has overhauled both transmitters and receivers in preparations for a big opening and lots of good DX this fall. W7EVW has been playing with the new Heath S.S.B. and having himself some fun. The NSN had 31 sessions with 439 QNIs and 96 QTCs for the month of July. Traffic and activity were down during the month with only three making the BPL column, namely W7APS, W7BA and W7DZX. The Lower Columbia Amateur Radio Association (LSARC), of Longview, has a new Cowlitz County Ham Directory, thanks to the hard work of W7ZJM and others. The SCM received a very interesting article and photos from the Grays Harbor EC regarding c.d. and RACES drills held recently in the Grays Harbor area. We hear by the grapevine that W7AMC has had another siege in the hospital. Sympathy is extended to W7KV, who lost his XYL in July. K7PVO has joined the fly boys. The Washington chapter of certificate hunters will hold its meeting in Richland this year. K7OFW and K7OFX are the local organizers of this chapter. W7OEB received certificate No. 2 and was accepted into TOPS. K7PVG and K7PVF/M added Jefferson County to many logs during a short stay in Port Townsend. K7VNV mobiled around W6-Land on 6 meters. W7OIH is a confirmed Rock Hound. (For sale complete station.) K7NIH and K7VSD/7 are operating from Madras, Ore. W7CAM and W7PGY were very QRL with summer homes. Fran at Lagoon Point on Whiby Island and Bob near Kingston. W7VI also has plans for something on Whiby in the near future. W7OEX and W7LWB went on a vacation trip to VE7-Land. Traffic: W7BA 896, W7DZX 741, W7APS 213, K7CTP 198, W7OEB 129, K7JHA 90, K7SRI 80, W7BTB 28, K7JRE 28, W7AIB 11, W7EVW 8.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WA6VAT is converting an APX-6. W6NWA mobile was on the Bayshore Fwy. in QSO with Donna, W6AUB, and saw an accident. He had Donna call the highway patrol and ambulance which arrived in very short order. Donna is 12 years old and is the granddaughter of WA6PTU and WA6QZA. K6TFT bought another car and got the license LID 314. WA6KLL is just about finished with the 250/1000-watt c.w. transmitter. Ron also will have ten elements on 2 meters at 70 ft. Fed using styroflex teedline. WB6ETY just got back from St. Louis and will be back on NCN. John is now ORS. The Oakland RC toured NAS Alameda O&R shops on July 21. The East Bay Club meets the 2nd Fri. of each month at El Cerrito High School. W6EY was going to work K6LRN for LRN's last CD Party QSO when Mac's DX-100 went sour. WA6WNG also operates from WB6CRC in Lake County. W6OJW reports fishing and mobiling during July. WA6ENG was in Alta Bates hospital and while recovering brushed up on his code. In the SACEN/6 hidden transmitter hunt WA6HSL was hidden. First in were WA6GRO and K6USH and second were WA6KFJ and K6KLY. I'm glad to see 3 reports from 3 OOs. For a section our size, over 650 ARRL members, there should be more activity. According to the July ARPSC Bulletin the EB section is 55 out of 73 for traffic listings. One way we can improve is by reporting each piece of traffic that is handled—in ARRL form that is. Another way is to QNI the various nets—NCN 3.635 kc. 0300Z daily; MTN 3.854 kc. 0200Z daily; GBN 3.975 kc. 0200Z daily; NCTN 0130Z daily 3.905 kc.; Silverado 6-Shooters 50.4 Mc. 0400Z Wed. 2100 Tue.; Silverado 2-Timers 145.35 Mc. 0400Z Fri. 2100 Thurs.;

(Continued on page 138)

NEW



Cush Craft SQUALO*

6-10-11-15-20 or 40 METERS

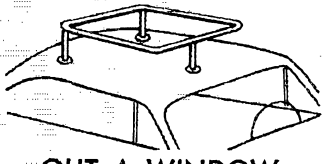
Cush Craft's continuing research produces another first —THE SQUARE HALO. Squalo is a full half wave, horizontally polarized, omnidirectional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. Full size and compact dimensions provide a low Q for broad band coverage. Direct 52 ohm Reddi Match feed gives an SWR of 1.5-1 or less from 50 to 51 Mc.

The 6 and 11 meter Squalos are packaged complete with rubber suction cups for car top mounting and a horizontal support for mast or tower mounting. The 10-15-20 and 40 meter Squalos are designed for mast or tower mounting where space does not allow for larger antennas. Squalo is ideal for net control, monitoring, or general ham coverage.

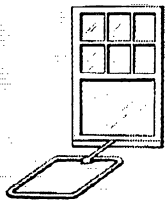
Whether you are a beginner, apartment dweller, or serious DX man the space saver Squalo is for you. You can buy one for each band and build a Squalo Tree!

Model No.	Description	Net Price
ASQ-6	6 meter 30" square	**$12.50**
ASQ-10	10 meter 50" square	**19.50**
CSQ-11	11 meter 50" square	**19.50**
ASQ-15	15 meter 65" square	**23.50**
ASQ-20	20 meter 100" square	**29.50**
ASQ-40	40 meter 192" square	**66.50**

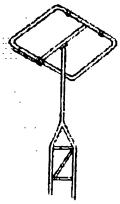
ON YOUR CAR



OUT A WINDOW



ON A MASK



*Pronounced Squaylo

Cush Craft

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BUY FROM YOUR DISTRIBUTOR OR WRITE FOR FREE LITERATURE

AREC Net 3.900 kc. 1730Z/1030 Sun.; EBRC 0230Z 7270 Sun. 1930 Sat. K6LRN traded the Triumph for a new Falcon and went East on vacation. As SCM I enjoyed a visit to the Silverado Radio Society and found that any regular member caught calling the society a club gets fined 10¢. The Oakland Radio Club will be working with the Oakland Chapter of the Red Cross on a drill to be held Oct. 20. Contact the SEC, Jack Palmatier, WA6OLF, 4135 Porter St., Oakland, for further details. Traffic: K6GK 70, WA8MIE 40, K6LRN 37, WA6FBS 35, WA6ZLZ 22, K6TFT 16, WB6ETY 13, WA6KLL 12, WA6OLF 6, WA6VAT 3, W6CBF 2.

NEVADA—SCM, Leonard M. Norman, W7PBV - W7JU/K7JU, our SEC, received recognition in the ARPSC Bulletin for being the only SEC with 100% reportings. W7CTK is running a Swan 400 in a new Lincoln. K7TKS is running a TR-3 in a new Dodge. W6EBS/7 is active in B.C. running a TR-3 and a 2-meter rig. K7UDG has been appointed OO. K7FER is monitoring 7220 kc. Mon. through Fri. from 0730 to 1700 local time for the benefit of mobiles and others who might need assistance. K7TNY still is looking for those DX stations. W7HQS has a new Pacemaker. K7SFN has been vacationing in Michigan. W4CJD/7 has been vacationing in North Carolina. K7OIR has moved into his new QTH. K7BGV is moving to Oregon. A radio store in Las Vegas reports a run on the sale of the ARRL *License Manual*. W7PBV and family spent their vacation in New Mexico. K7RKH visited K2US and WA2US at the World's Fair and gave a report. The Nevada Traffic Net on 3660 kc. needs more check-in and traffic outlets. Traffic: (July) W4CJD/7 119, W7JU 10, W7PBV 3. (June) W7SHY 8.

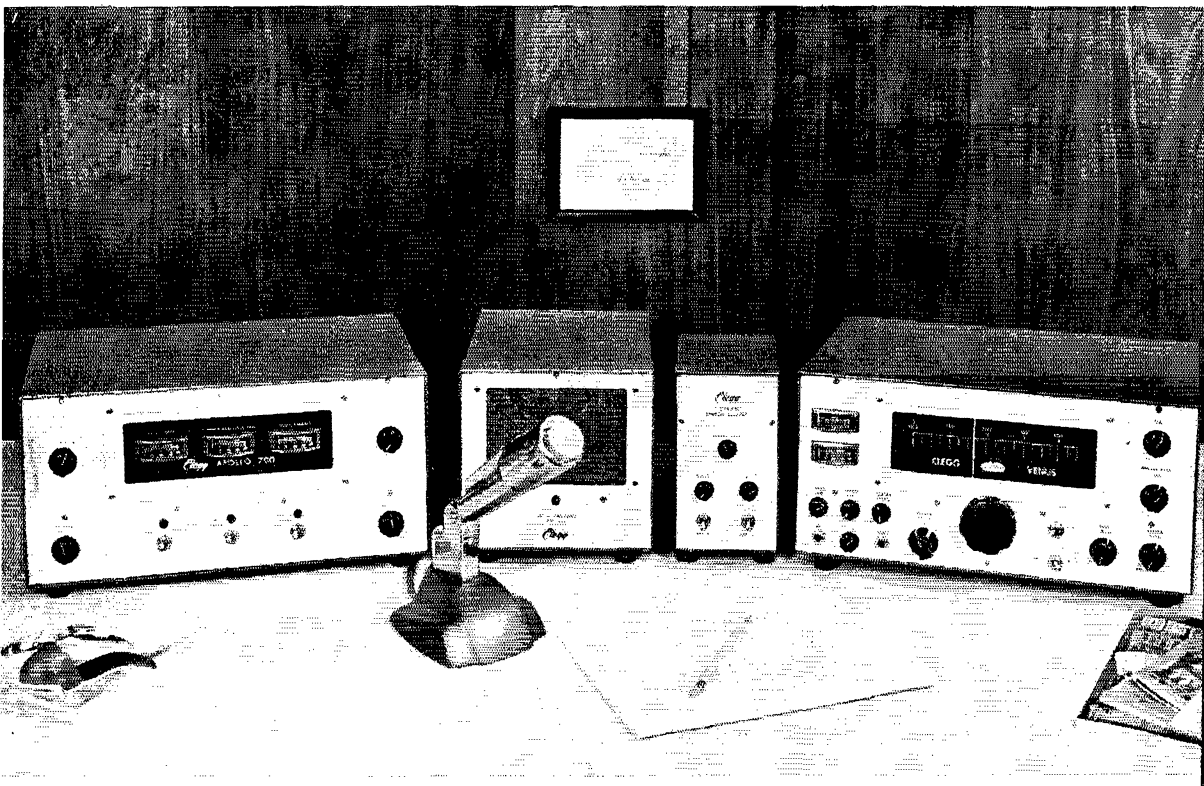
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6HYU. The new editor of the El Dorado County ARC, W6LSW, says in the monthly bulletin that the club is asking of its members: Are you prepared for an emergency? Are you able to fit into the Emergency Communications Plan? Have you read it lately and/or is it readily available? Any suggestions and/or recommendations will be welcomed and appreciated. The EDARC is offering to its next prospective "ham" (one who has not held a license within the past six months) a new 6DS4 Nuvistor or gift of equivalent value, on receiving his or her license. A similar prize will be given to the next club member upgrading his license. Proof will be accepted from the date on the new FCC license. A discussion on Radio Direction Finding and Transmitter Hunts is planned for the next meeting by K6UML and W6NRA. The North Hills Radio Club's new officers are K6VT, prexy and editor of the club's *Newsletter*; W6PAB, vice-pres.: K6TWE, treas.; WA6VEH, secy.; W6ZOH, activities. The *NHRC Newsletter* has it that WA6PAB reports band openings on 6 meters. Bill has one dozen "rocks" for 50.20-02 Mc. which he will be happy to give at no cost to club members sincerely interested in starting a 6-meter net. Lou would appreciate more news items and may be contacted by phone, 967-0579, before the 10th of each month. Your prexy is active on MARS 2308 c.w., has constructed an eight-element GD beam from technical diagrams furnished by K6TS and enjoys 2-meter rag-chews. RACES News from Glen County: The regular monthly meetings will commence in September. Modification of GCR 2-meter WBFM gear goes on at the new offices located on the top floor, Court House Annex, Willows, Calif. Modification of Tehama County RACES 6-meter gear: QTH Chauncey, W6RZW, in Paskenta. Reported and confirmed by K6KUI and WA6SCJ, a steady signal on about 50.6 Mc. The occasional "cheep, cheep, cheep" of a strong test signal on about 50.4 Mc. day and night is reported but not confirmed. From their area, 6 meters to Texas and Arizona is poor, but there is a host of VE6s, HO, OF, ALL, AGM, AIT and WOs. WA6SCJ boasts of an FB QSO with K6GHD/6 parked on a ski slope of Mt. Shasta, over 100 miles line-o-sight, in spite of cross polarization of a 6-meter antenna. This resulted from a complaint to the PG&E about 100 to 110 v.a.c., between 6-7 P.M. PDT. 122 v.a.c accomplished the foregoing which they term: The result of result! W6LNX of the Sacramento ARC, is busy on 14 Mc. and 2 meters with good luck on DXing, working VS1, VE8, VK2, LU5, AP2s. SVS's newest EC, W6MMO, Deputy Sheriff, Yolo County Sheriff's Office. W6WLI, OBS and OO, has returned from vacation in KH6-Land. He now has 43 states RTTY. Traffic: W6LNZ 13.

SAN FRANCISCO—SCM, C. Arthur Messineo, W6UDL/K6CWP—SEC: W6KZF. W6YKS, from up Eureka way, reports that he soon will be joining his National Guard unit and will be QRT from that area for about six months. John and W6BWV have just completed 6-meter transmitters and report they are perking FB. John is doing an FB job as ORS, 50.25 and 147.51 is constantly monitored to aid tourists in that vicinity. WA6-

(Continued on page 140)

SIX METER SIDEBAND . . . with POWER

Clegg



YOU HAVE HEARD THE VENUS—the cleanest six meter sideband signal on the air—and now a new dimension is added . . . *POWER*. With APOLLO 700, the new Clegg six meter linear with integral power supply, seven hundred—plus watts PEP input makes that VENUS signal a real standout. Top that off with the Clegg SS BOOSTER—the latest Squires-Sanders development in outstanding amateur communications gear—and you have the hottest six meter sideband rig imaginable!

The VENUS, APOLLO, SS BOOSTER and the 416 VENUS AC POWER SUPPLY/SPEAKER are matching units—in performance *and* in styling. These are just a few of the "plus" features that result from years of successful Clegg experience in the design of VHF equipment:

VENUS: Standard Frequency Range, 49,975 to 50,475 KC; **Receive:** Nuvistorized front end for maximum sensitivity; 9 MC crystal lattice filter in both receive and transmit mode; Receiver offset tuning ± 1.5 KC; Peak noise limiter for AM adjustable threshold limiting SSB/CW; 10 KC per knob revolution tuning ratio; Slow AVC release especially designed for 6 M SSB; **Transmit:** 85 watts PEP input—all modes (AM, SSB and CW); Unwanted sideband down more than 50 db at 1000 cycles; Carrier suppression greater than 56 db; Distortion Products down more than 30 db at full ratings; Frequency Stability—less than 100 cycles/hour after warm-up; Broad band circuits throughout provide maximum simplicity and ease of tune-up. Physical dimensions are just right for fixed installation or mobile—15″ wide x 7″ high x 10½″ deep—21 lbs. Available now.

APOLLO 700: Six meter linear amplifier—Power input 700 watts PEP with 10 watts of drive; Final tubes type 8236; Integral power supply; Three illuminated meters—Grid Current, Screen Current or RF output, and Plate Current; Instant Exciter/Linear selection when used with VENUS. Cabinet identical in size to VENUS. Available in July.

SS BOOSTER: Type A—Up to 20 db increase in average power through r.f. speech processing.

VENUS 416 AC POWER SUPPLY: Attractively styled power supply/speaker combination to power the VENUS. Available now.

AMATEUR NET PRICES: VENUS, $495; 416 AC SUPPLY, $110; APOLLO, $247.50; SS BOOSTER, Type A, $97.50.

Keep in touch with your distributor or write for further detail.

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QXV is experimenting on antennas. K3JHE/6, in Petaluma, reports several good openings on the v.h.f. bands. WA6IVM has returned from a month-long trip to Japan. From what I hear on the grapevine, both he and Cathy, his BW, really had a wonderful time visiting JA hams in all of the districts. Plans for the Greater Bay Area Hamfest are progressing rapidly and preregs should hurry and sign up. Write to P.O. Box 113, Hayward, Calif., for tickets or information. The BAYLARC had its annual picnic at Vichy Springs near Napa with a wonderful turnout. Bill, our SEC, asks that you keep your training program going in message-handling. The recent Alaskan disaster showed a definite lack of traffic-handling knowledge. W6CTH, who also recently returned from a visit to JA-Land, showed wonderful slides at the SFRC meeting. The Tamalpais Club recently helped out at the First Annual Cross Country Race in Novato. The Marin Club plans on handling the Annual Dipsea Race from Mill Valley to Stinson Beach. The Livermore Club was in the Rodeo Parade in that city. We had a visitor recently, K6GUQ. She actually came to visit my XYL, WA6ALK. Because of a heavy work schedule and irregular hours since the first of the year, I find that I will not be able to continue as SCM of this section. I have not been able to visit clubs with the regularity that I would be expected to, and in fairness to all I resign this office. Thanks to all who have faithfully sent in reports and kept me informed of activities of their areas. I sincerely wish I had more time to devote to this office - maybe at a future date when there is more time I could have another go at it. Traffic: W6YKS 318, W6UDL 10, WB6GVI 4, WA6QXV 3.

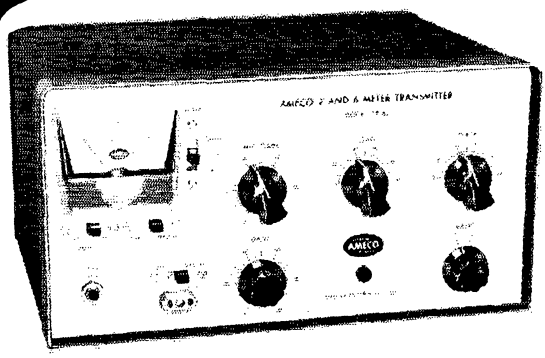
SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The new officers of the Tulare County Amateur Radio club are W6ILR, pres.; W6UHN, vice-pres.; K6VWV, secy.; WA6TQL, activities. WB6HDA is on s.s.b. with a 20A exciter and 600L amplifier. WA6YPN has a Ranger and a Johnson t.r. switch and is active on NCN, RN6 and PAN. W6ADB and W6DIY held daily skeds with each other while W6DIY was vacationing in Santa Cruz. W6HAB has an SB-33. K6IXA and W6HAB have applied for VE calls and will be vacationing in VE-Land. W6DYY is heard on 75-meter s.s.b. with a TR-3. K6MIO is on 432 Mc. with a kw., and has worked K6LEW in Sacramento and K6HCP in Palo Alto. W6FZA is on 420-Mc. s.s.b. WA6FBL and K6GZN are building up a couple of 6-meter mobile rigs. W6QFR and W6KB are holding skeds on 75-meter s.s.b. W6PXP is handling traffic for the boys on the Islands in the Pacific. K6SEV has a Panadapter for his Drake receiver. W6JUK is heard on c.w. WB6ETQ is back on 20-meter s.s.b. with a kw. working DX. W6KUT was a recent visitor in Fresno. Keep up the good work with your reports, as I need them. Traffic: (July) WA6YPN 172, W6ADB 168, (June) W6ADB 160.

SANTA CLARA VALLEY—SCM, Jean A. Gimelin, W6ZRJ—Asst. SCM, Edward T. Turner, W6NVO, SEC: WA6HVN. V.H.F. PAM: WA6RXB. Traffic and activity remained high in the Northern California Section Net through the summer months. The new season is now with us. How about checking in and trying your hand at c.w. traffic operation? NCN meets daily at 0300Z on 3635 kc. All are welcome to check in, and c.w. speed is not important. W6RSY vacationed at Tahoe for two weeks. K6GZ reports normal summer time activity on the nets. W6HC handles a TCC sked with W1NJM. W6PLS reports activity on several nets, including SCVSN. Gene attended the Reno Hamfest and Southwest Division Convention. W6ZRJ vacationed at Trinity Lake and worked a.m. and c.w. mobile. W6QMO, active on NCN, installed a new vertical. Jeri has recovered from minor surgery in August. W6ASH is active on the Oscar Net and reports there are now three operating sections. W6AUC is active on the Sketo Net. Russ also has been active as OO on the Novice Band. K6YKG is again active on NCN. WA6AUM has left the section to attend college in Pennsylvania. W6RFF is endorsed as ORS. W6ZLO now has a second station in Monterey, with the call W6CAM. Glen originally held 6CAM in 1921-22. W6YHM returned from three months activity in Washington for the U.S. Geological Service and then left three days later for Alaska. W6OII is active handling traffic on phone. WA6RXB reports the Santa Clara Valley section had 11 active stations, 6 sessions, 29 check-ins and traffic of four. The net meets at 8 P.M. on 146.7 Mc. Let's all get behind our 2-meter section net this fall and try to pick up the activity. K6TEH presented a program to the Salinas Kiwanis Club and set up a portable a.f.s.k. RTTY on 144 Mc. He worked K6DYX, WA6CBQ and WA6ZHN. K6MTX is back on 2-meter RTTY and has been doing some 80-meter work. W6DEF is active on NCN. The Redwood City C.D., under the direction of EC K6ANN, conducted a drill in which 11 mobiles and 5 home stations took part. Included were W6GYX, K6MPN, K6DRN, K6OTR, WA6QDC, WA6LCG, WB6HIX, WB6EVH, WB6CAB, WA6YFY and WB6UOK. W6WX

(*Continued on page 142*)

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!

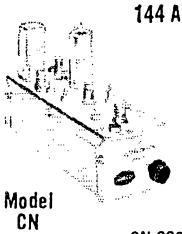
SPECIFICATIONS AND FEATURES

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

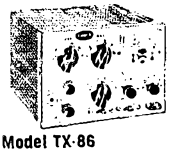
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. 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



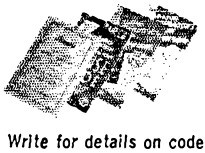
Model TX-86

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

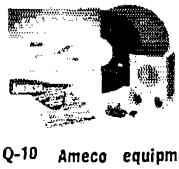
CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix. 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 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-10*** ***Ameco equipment at all leading ham distributors.***

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reports participating at Oscar Hq. during Field Day. K6HEP made the 15-w.p.m. CP certificate. WA6HVN has been active on the National Convention Committee and works MTN. Hal is planning the section participation in the SET. Traffic: (July) W6RSY 785, W6JXK 314, W6AIT 210, W6YBV 171, K6GZ 168, K6DYX 69, W6HC 57, W6PLS 48, W6ZRJ 31, W6QMO 26, W6ASH 20, W6AUC 19, K6YKG 11, WA6UAM 8, W6RFF 6, W6ZLO 5, W6YHM 3, W6OH 1. (June) W6DEF 74, W6PLS 36, W6WX 4.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corus, W4FDV. SEC: W4MFK. RM: WA4FJM. PAM: W4AJT. V.H.F PAM: K4MHS. WA4ICU visited ARRL Headquarters en route to a Maine vacation WA4LWE, NCSSBN manager, wishes to establish 3938 kc. as a calling frequency for N.C. traffic, and says there will be monitor stations on that frequency most of the day and evening, so bring your traffic and it will be accepted in any *mode*. WA4DYN has picked up seven new states on 6 meters. WA4QJA and K4SHU have advanced from Technician to General Class. W4RWL received his WAS certificate and says he worked most of the states with only ten watts input. WA4EYA has been operating portable from Camp Sequoyah handling messages to and from the boy's parents. W4EVN is trying to stir up some AREC activity in Robeson County. WA4KAC says he is going to QSY to Georgia Tech, this fall. WN1BQY, WN2KDD, K2UNH, WN2KGE, WN2NOV, WN2LUG, WA2GKJ, KN3FQE, K3ZFD, WN4VCV, K4TXK, WA4RLI, WA4BNH, WA4CCR, W4ZCC, K4EOL, W4PPB, K4ANJ, WN4RLH, K5IPL, WA8PVY, K8LRZ, WA8BBF, K9FUL, WN9JOL, WA9ANX, K9FVK, WA9COE, WN9KYE, WNØAUX, WNØHBZ and KØOXR all operated portable four at Camp Albert Butler near Roaring Gap, N.C. Net traffic: NCN (E) 245, NCSSB 155, NCN (L) 129, THEN 63. Traffic: (July) W4LWZ 218, WA4EYA 140, WA4PDS 132, WA4ICU 110, W4EVN 108, WA4KAC 101, K4CDZ 97, WA4LWE 83, WA4DKZ 54, WA4FJM 43, WA4ANH 37, K4EO 28, W4BNU 24, K4YYJ 18, W4COJ 15, W4RWL 8, WA4GEU 5. (June) WA4LWE 46, WA4KAC 36.

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 0030Z S.s.b—3915 kc at 0100Z New appointments: WA4PFQ as OPS Congrats to the Florence Club on ARRL affiliation. W4NTO, top OO, reports 48 observations during July. New OBSs WA4LPV and W4LPX are doing an FB job with bulletins on both phone and c.w. W4JA has some new frequency measuring techniques. The a.m. phone net is regaining participation after its move in frequency. The annual section meeting will be held Oct. 10 at Rock Hill, under the auspices of the State Radio Council. Director Anderson will be the main speaker with reports from all section officials. The annual 4RN meeting also will be held in Rock Hill that week end. The s.s.b. gang reports that this year's "Operation 22" from the Easter Seal camp at Cedar Mountain again was a big success. Net traffic: C.w. at 83, a.m. 17. Traffic: WA4PFQ 75, WA4EMY 60, WA4JHD 47, K4OCU 41, WA4ILO 34, WA4LPX 26, W4PED 16, W4JA 4, WA4LPV 4, W4NTO 4.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SHJ. RMs: W4ZM, WA4EUL, W4SHJ, W4QDY. PAMs: W4JMA (s.s.b.), W4DKP (am.) Summer doldrums and vacations were reported by W4MXU, W4WBC, WA4DUW, W4DLA and WA4FSC. W4DLA visited some of the EAN gang and had TL8SW as a visitor. WA4IVM is on the night shift. WA4HQW is going to college in Indiana. K4JKK is plagued with transmitter troubles. Jobs are keeping K4ITV, K4YZT, WA4EUL and K4TZF from being as active as they would like. K4GRZ reports the Blue Ridge Net, meets Tue. and Thurs. 0200Z on 50,124 Mc. W4CVO still is confined to working mobile. W4JMA made the Virginia Ham 500 Award. Norfolk area hams held a hang-up hamfest sponsored by the Tidewater Club. W4JUJ still is winning contest awards—he likes c.w. best. K4NOV now is on 2-meter phone in addition to 6 and 10. W4MK reports that band conditions were not too good during July. W4RHA bounces back with a big traffic total. The Winchester Hamfest came off in fine style. K4PXY is active again in traffic with maritime mobiles. K4BAV's receiver is on the rocks. W4PTR modified the receiver and put up several antennas. Ye SCM now has 6-meter capabilities. W4DKP, s.s.b. sparkplug, now is getting interested in emergency work. W4NYX is installing vacuum caps in the final for more realiability. W4DVT got his DXCC after 24 years! K4WUM worked YHEXY in the C.W. DX Contest. W4BZE is looking forward to the fall season. "The best Field Day yet," says W4IOD from Eastern Shore. K4ASU is the new Norfolk (city) EC and also Area 1 EC. How about other parts of the Virginia section

(Continued on page 144)

12 NEW AMATEUR BEAMS

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ALL GOLD CORODIZED

ALL GAMMA MATCHED

3 New combination 6 & 2 meter beams
5 New 6 meter beams
3 New 2 meter beams
1 New 1¼ meter beam

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getting on the ball in EC work? W4OP has an FB picture QSL card. Traffic: (July) K4PXY 505, W4RHA 474, WA4EUL 168, W4DLA 158, W4NLC 130, W4JMA 118, W4MXU 118, WA4FCS 111, W4DVT 100, W4OKN 62, WA4SHD 45, W4QDY 44, K4ISM 38, W4TE 37, W4-DKP 34, W4PTR 34, K4LMB 29, W4NVX 25, WA4FSC 24, K4SDS 23, WA4DUW 18, K4GRZ 18, WAJRY 18, WA4HQW 14, K4TZF 12, WA4KVR 11, W4LK 11, W4-CVO 10, WA4IVM 10, K4NOV 10, W4MK 8, W4JUJ 7, K4WUM 6, K4ITV 4, W4OID 3, W4BZE 2. (June) W4-DVT 262.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: K8HID. PAM: K8CHW. S.S.B. Net Mgr.: K8EEO C.W. Net Mgr.: W8LMF. West Va. Nets meet on 3570, 3890, 3903 and 3905 kc. Local nets also are operating in the 50- and 144. Mc. bands. A fine first report from WA8KUW gives him a BPL certificate. WVN (c.w.) reports 10 summer sessions, 54 stations and 26 messages. West Virginia plans to compete with Colorado. K8YEU is working on ham TV on 432 Mc. WA8CRW schedules KP4s for traffic to the Mountain State. W8IRN, Kanawha County EC, plans a communication "bus" for ARPSC work. New ECs appointed by SEC W8SSA are W8CWY, Brooke Co.; K8ZPR, Hancock Co.; WA8FCZ, Ohio Co.; WA8HPE, Marshall Co.; K8MIDI, Mineral Co.; W8HZA has the new antenna system up and is active in RACES work. K8-CHW reports WVN (phone) 15 sessions, 278 stations, 39 messages. W8WHQ continues his fine mobile DX work. K8TPF reports WVN (PON) handled 262 messages. Tops in the Worked All Counties above 30 Mc. is 7 counties to date. Traffic: WA8FIC 252, K8TPF 142, WA8KUW 141, W8LMF 51, K8CHW 7, W8CKX 7, WA8-HHF 7, K8MHR 7, K8ZDY 5, WA8BSE 3, WA8FIE 3, W8HZA 3, K8EPI 1. K8ZDV 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØ-TTB. WØPG reports that 3 more Colorado hams have advanced to Extra Class, KØFHD, KØKKU and KØ-EVG. Since I have very recently had my wrist slapped in regard to printing news about the views of net operations as submitted to me, I would like to devote this to *nets*. What is a net? In my opinion it is the training ground for hams to learn about handling traffic. If all nets were perfect, then we would need no further training, as we would be experts. Now, the question is this: Who is the teacher for *net* training? Looks to me like all *net* members are teaching each other. Now, this is good, but at the same time we must realize that along with this we are learning also, and if someone comes along and criticizes the operation this should be used as a tool of learning and not as an insult to the *net*. In general if the ideas are good, try it. Don't run around with a chip on your shoulder. No one likes to be told his pet project or idea is not the best but many times in the past things would have been much better if I had only taken the advice of others. We talk about advancing the art of ham radio. To do this we are going to have to listen and learn. You can't tell, someday somewhere you might get a good suggestion from someone on the bottom of the totem pole. Traffic: KØZSQ 133, KØDCW 76, WØHXB 68, WØANA 37, KØLCZ 28, WØCBI 8, WØPGX 6, WØLCE 3, WØMYB 3.

NEW MEXICO—SCM, Newell Frank Greene, K5IQL —Asst. SCM: Kenneth D. Mills, W5WZK. SEC: K5-QIN. RM: W5ZHN. The Breakfast Club and NMEPN return to winter schedules Oct. 1. Six New Mexico members attended the Rocky Mountain Division Convention in Estes Park. K5HTT is the new EC for Los Alamos and is recruiting members. The White Sands ARC held its annual swimming party. We learned that W5UNK has a new 62S-1, W5CMK finished his 20-meter s.s.b. transceiver for mobile and fixed operation and WA5FLG is hoisting a two-element beam for 40 meters. WA5BMN is working the DX on his homebrew rig, running 90 watts. Ken Mills let his license lapse, and is sweating out that interminable period of waiting for a new one. Have you checked the expiration date on yours lately? Anticipating the worst winter yet, in this dip of the sunspot cycle, some fellows are planning 160-meter operation already. Traffic: W5UBW 38, WA5-DUH 23, K5HTT 3.

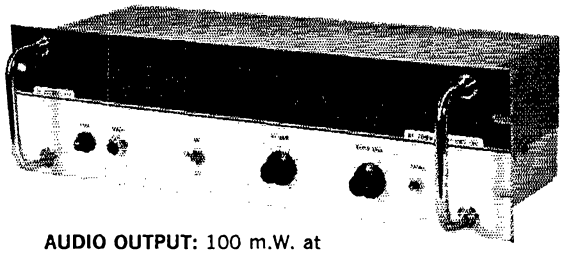
UTAH—SCM, Marvin C. Zitting, W7MWR—SEC: W7WKF. This being my first report as SCM I would like to express my thanks to the former SCM, W7QWH, for the excellent job he has done as SCM during the past seven years. I believe I can speak for all Utah amateurs in wishing Tom success in his new venture in Maryland. The final results of the Utah Council of Amateur Radio Clubs Field Day competition show that the clubs finished in this order: 1. UARC (Salt Lake). 2. Murphy's Rebels (Salt Lake). 3. MARS Communicator Club (Hill AFB). 4. Ogden Amateur Radio Club. 5. Bountiful Amateur Radio Club The UARC

(Continued on page 146)

SSB COMMUNICATIONS

TWO NEW **FIXED CHANNEL** SSB RECEIVERS FOR ***COMMERCIAL APPLICATIONS***

Model RF-501, Single Channel Strip Receiver



FREQUENCY RANGE: 1.6 to 28 Mc with Four plug-in heads

FREQUENCY STABILITY: 3 parts in 10^7 per day

SENSITIVITY: 1uV for 10 db S+N/N

IMAGE REJECTION: 65 db

IF REJECTION: 70 db

IF BANDWIDTH: 2.1 KC, Mechanical Filter

AGC: 3 db Audio Variation, 10uV to 100,000uV
Time Constant 0.02 seconds charge
2.0 seconds discharge

AUDIO RESPONSE: 350 to 2450 cycles

ANTENNA IMPEDANCE: 50 ohms unbalanced

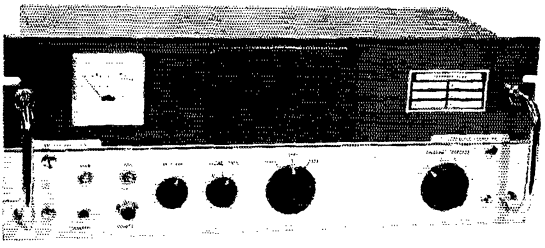
AUDIO OUTPUT: 100 m.W. at 600 ohms balanced, 1 watt at 3.2 ohms

POWER INPUT: 115/230 volts, 50/60 cycles Approximately 65 watts

SIZE: 5¼" H x 17" W x 6" D

WEIGHT: 15 pounds, approximately

Model RF-503, Six Channel SSB Receiver



METERING: "S" Meter

POWER INPUT: 115/230 volts, 50/60 cycles Approximately 70 watts

SIZE: 7" H x 17" W x 8" D

WEIGHT: 17 pounds, approximately

FREQUENCY RANGE: 1.6 to 25 Mc

MODE: SSB-Selectable upper/lower sideband and Compatible A.M.

FREQUENCY STABILITY: ±2 part in 10^6

SENSITIVITY: SSB-1uV for 10 db S+N/N A.M.-1.5uV for 10 db S+N/N at 30% Modulation

IF BANDWIDTH: SSB-2.1 KC Mechanical Filter A.M.-7.0 KC

AGC: Fast/Slow Time Constant

AUDIO RESPONSE: 350 to 2450 cycles

ANTENNA IMPEDANCE: 50 ohms unbalanced

AUDIO OUTPUT: 100 m.w. at 600 ohms balanced 1.5 watts to built-in speaker

SPEAKER: 4 x 6 inch

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has placed first for the past three years and now will have permanent possession of the Field Day trophy. Congratulations to the UARC Field Day Chairman, W7APY, and to the many UARC members who made this win possible! W7OCX reports that the Utah Section was well represented at the Rocky Mountain Division Convention in Estes Park, Colo. Our Section Traffic net is the Beehive Utah Net (BUN) and meets daily at 1930 GMT on 7272 kc. BUN is a part of the National Traffic System; so if you have traffic be sure to check in. Also check in to receive traffic for your particular locality and give our net better statewide coverage and service. The Salt Lake Amateur Radio Club (officially known as the Utah Amateur Radio Club, Inc.) held a hamfest in Mill Creek Canyon, near Salt Lake City, on Aug. 22. Please send your reports to my address shown on page 6. Traffic: W7OCX 21.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM and ORS: K7QYG. OBS: K7TAQ. Nets: Pony Express, Sun. at 0800 on 3920. YO, Mon., Wed., Fri. at 1830 on 3610; Jackalope Mon. through Sat. at 1230 on 3920 kc. W7DW/M was instrumental in reporting a forest fire via K7SLM. V.h.f. activity has been very poor for Wyoming this summer but the boys still are listening for an opening. W7NKR had a ham get-together at his lake cottage in August. Some new mobiles: W7DW and K7OOP. New rams as a result of the Casper Club's code classes are WN7ALY, WN7AXX and WN7BAR. Your SCM received the 1963 PICON Award at the Division Convention. Didn't think I did much out of the ordinary to receive it but am very pleased with the honor. News is requested from all parts of the state to help keep this column interesting. Traffic: K7TAY 42, K7SLM 15, K7HAW 4, K7VTM 2, K7SAR 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—SEC: W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. According to the ARPSC Bulletin we advanced in both AREC and traffic nationally last year. We were up to 7th in the AREC and 14th in traffic. We were 1st in S.E. in AREC and 2nd in traffic. We hope to improve this year, so you ECs get your reports in and everyone report his traffic to me. K4WOP is mobile on 40-meter c.w. K4GXS is mobile with an HW-12. K4FJZ has a new ten-element homebrew 2-meter beam. A new ham in Tuskegee is WA4MYE. The Limestone Club now is ARRL affiliated. Alabama stations have been rare in recent CD Parties, especially phone. July net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100	Daily	29	3	7.6
AEND	3725	2200	Mon.-Sat.	27	1.04	5.52
AENM	3965	0030	Daily	31	2.4	41
AENO	50.55	0115	T/T/Sat.	14	.6	17.5
AENP	3955	1230	Mon.-Sat.	25	1	14
AENP	3955	2400	Daily	35	1.8	21.9
AENT	3970	2230	Daily	35	1.485	—

WA4RKU now is on 6 meters. K4IKR has his final going. Traffic: WA4EXA 125, W4NML 84, K4WHW 81, K4WOP 71, K4WWP 56, W4YNG 46, K4BSK 33, K4AOZ 31, WA4GLX 28, WA4EXB 26, WA4JWS 20, W4DGH 15, K4NSU 10, K4JDA 9, K4ANB 8, K4BTO 8, K4KJD 8, K4FZQ 7, K4GXS 7, WA4PLG 6, W4YRM 4, K4RIL 2, K4VJL 2, W4CIU 1.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI—SEC: W4IYT. A.M. PAM: W4SDR. PAM S.S.B.: W4OGX. RM: C.W.: K4KDN. RM RTTY: W4RWM. PAM V.H.F.: WA4BMC. The Alaskan fiasco is one that should bring to the attention of the amateur that decadence has set in to an appalling extent. The complacency of those who pretend to practice the art under the fundamental rules and prerogatives yet do nothing other than chew the fat from morn til night about girl friends and matters that sometimes border on the obscene is showing. Further, these appliance operators are the very ones who have screamed the loudest about IL. The saddest part of the facts is that these cannot be brought back into a line of usefulness for most of them never had any capability beyond that of a glorified CBer. Thus in an emergency the load of responsibility falls upon those amateurs who have devoted years to competent public service; ones who are capable of reasoning and who comport themselves with the restraint and compliance which such occasion require. But, what chance have they got when the bands become stampeded by a horde mouthing stupidity that borders on hysterical idiocy? In ARPSC No. 2 Mr. Hart stated—"We have often said that the NTS is a limited-load system. There is really no arguing with this statement, because it . . . applies to any system." The SECs of Florida have been forwarding for some time a plan to employ s.s.b. and RTTY. Florida Civil Defense has been working on a RACES AREC plan for

(Continued on page 148)

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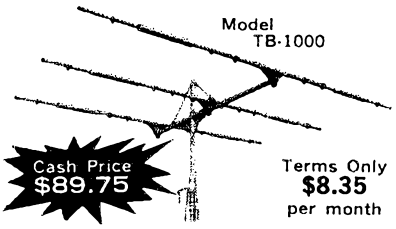
Model
TB-1000-4

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.

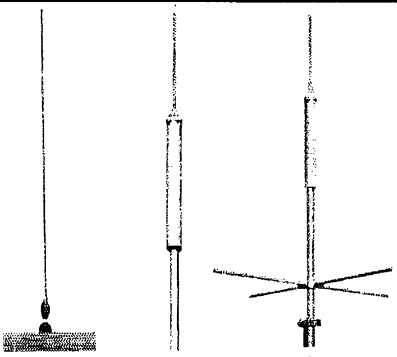
Model
TB-1000



Cash Price
$89.75

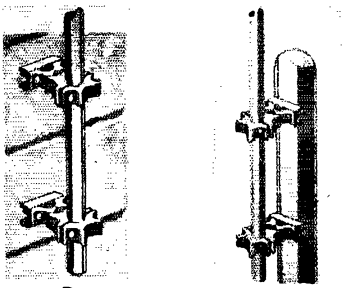
Terms Only
$8.35
per month

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.

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- ☐ 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.

two years and is in the process of implementing the use of s.s.b. as command and RTTY for the bulk traffic. Very simple, yet powerfully effective with proper guidance and support. So let us in Florida get wooing for competent operation and compliance in the art that once was proudly, even respectfully, known as amateur radio. May your tubes run cool! Traffic: (July) WA4BMC 430, W4TUB 193, K4BY 187, K4CCO 135, W4URX 135, W4SDR 115, K4KDN 111, W4AKB 91, WA4NBE 71, W4OGN 71, W4GJI 64, W4IEI 57, W4LUV 38, K4QAY 38, K4DAX 33, W3IYT 32, WA4NEV 29, WA4DKG 28, K4ODS 28, W4AYD 25, K4EZL 25, K4ILB 25, W4YJM 20, K4LCF 19, WA4PNZ 18, WA4RQR 17, W4GWF 16, W4TJM 14, W4EHW 13, W4FP 12, K4MTP 11, W4BKC 9, K4ENW 9, WA4FGE 9, WA4RHL 7, K4EBE 6, WA4IYG 6, WA4RXG 5, WA4FYV 4, WA4JYB 2, W4LVV 2, WA4STV 2, WA4UYB 2. (June) WA4JYB 42, K4ENW 12.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: K4MDC. RM: W4DDY. PAMs: W4FYH, K4PKK, WA4EHT. The Lanierland Amateur Radio Club continues to grow and prosper. The Georgia Teenage Net meets each Sat. on 3900 kc. at 0600 GMT. Your participation will be welcome. WA4PSA, running a new Swan 240, made WAS. WA4LMV and WA4PRZ have new tri-band quads. WN4PMR took the Technician Class exam. W4NT has been under the weather. We hope for a full recovery by now. WA4RWA worked the West Coast on 6 meters with 5 watts. WA4PRZ sends a fine list of DX from 20-meter c.w. K4MCL is looking for 2-meter skeds. Anyone looking for Albany, Ga., please note. W4YE operated a dispatch-case portable c.w. rig from KP4 and KV4. He keeps regular skeds with his son W4YZC. K4YSA teaches a theory class at the Savannah Radio Club. WN4SRH is building a parabolic reflector for 2. K3QMG/4 is returning to civilization after enjoying(?) a long vacation in Viet Nam. W4HOS won a Dept. of Defense certificate for the Armed Forces Day messages for the fourth year. W4PIM has an NCX-3 for the new shack and QTH and says it's a fine c.w. rig. The North East Georgia Emergency Net meets Fri. at 0200 GMT. WA4QHQ and WA4URT are new Generals and WA4GIM is watching the mail for his license. Traffic: W4RZL 165, W4DDY 127, K4MCL 120, WA4MPD 88, W4NSO 85, WA4EHT 28, W4PIM 23, WA4PSA 18, WA4PRZ 16, WA4BVD 14, K4FRM 12, WA4LLI 11, WA4CJN 9, W4HOS 6, WA4HSN 3.

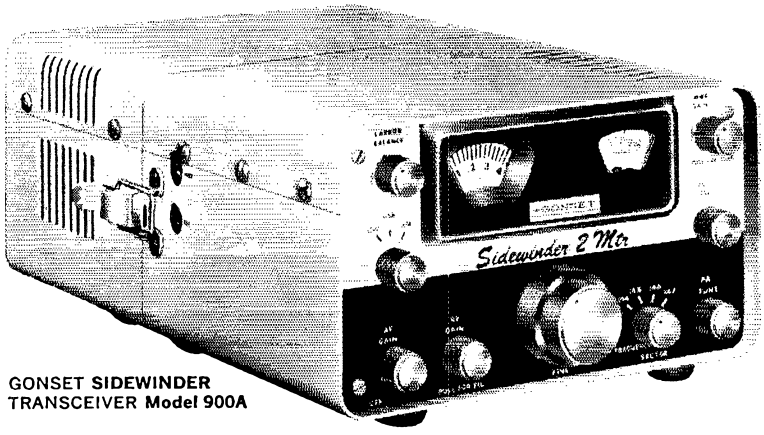
WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Tallahassee: K4IYJ, former TARC member has joined the Silent Keys. K4DAD is looking for new TARC members on the F.S.U. campus. W4MLE has switched to s.s.b. with an HT-37 procured from K4OHR. Gene is back on a.m. temporarily with the AF-67. K4YPI has a Viking 6N2 and has worked as far as Panama City, using a 2-band quad. Panama City: W4ZJB, W4YLY and K4VFY were appointed Asst. EC's for Bay County by WA4NRP. WA4OGP has a new Valiant. WA4FJF won the USA-CA award. WA4FIJ is building a new 432-Mc. converter; he keeps a regular sked with Orlando on 2 meters. Fort Walton: The EARS was host at a picnic at Eglin Field #9 for the West Fla. Phone Net members and area hams. New calls heard on 2 meters: WA2HZR, WN4UIU, W4HTG and WA4RDU. Pensacola: K4SMB has new working hours from 11 P.M. to 7 A.M., which is cutting into his hamming activity. K4SOI traded his v.h.f. transverter for an HT-32B. W4PAA has a new fold-over tower. Traffic: WA4IMC 586, W4BVE 98, K4VWE 42, WA4FIJ 38, WA4NRP 12, K4SOI 3.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7TNW. The Annual Hamfest at the Coconino County Fair Grounds near Flagstaff was well attended and a good time was had by all in spite of the heavy rain. We all wish to thank W7RFE for the work he went to in obtaining such a fine location for our hamfest. I am sorry to report that W7AIV, Phoenix, is a Silent Key. W7CAF is doing a fine job handling Okinawa traffic. K7NTW has accepted a position with the Pacific Area TCC. He also holds down a position as NCS on TWN. K7YAS and K7WZX have new General Class licenses and W7CAF has a new Extra Class license. All are in Phoenix. W7FKK has a new three-element full-size beam on 20 meters. Your SEC, K7NIY, is looking for new ECs. A note to him will bring you full details. Traffic: K7TNW 189, K7NHL 85, W7FKK 26, W7CAF 11, K7PLO 1.

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: Richard H. Ingham, WA6DJB. SEC: K6YCX. Asst. SEC: W1KUX/6. PAMs: K6PZM, W6ORS. RMs: W6BHG, W6QAE. Six stations made the BPL in July. Congrats, gang! The Hoffman Radio Club is reforming and setting up W6CZ in new quarters in El Monte with WA6ADH at the helm. The Golden Bear

(*Continued on page 150*)



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TRANSCEIVER **Model 900A**

SOLID STATE "SCOOP" FROM GONSET!

FIRST AND ONLY TRANSISTORIZED 2 METER SSB-AM-CW TRANSCEIVER FOR MOBILE, PORTABLE AND FIXED COMMUNICATIONS

The totally new Gonset Model 900A *Sidewinder* is the first and only transistorized SSB-AM-CW transceiver (except mixer, driver, final stages in transmitter) to provide complete coverage of the 2 meter amateur band in 4 segments 1 MC wide. Yet it's so compact it fits quickly under the dash of the newest cars! Transistor design makes possible a primary power requirement in the receiver of less than ½ amp! Separate power supply accessories snap-fasten to back of transceiver, or may be used for remote installation. Here's the trouble free, solid state transceiver with power to spare for any fixed, portable or mobile application!

For complete information, visit your Gonset Distributor, or write Dept. QS-10.

CHECK THESE HIGH-PERFORMANCE SPECIFICATIONS:

TRANSMITTER: Transistorized (except for mixer, driver, final states) • **Frequency Range:** 144-148 MC • **Power Input:** 20 watts PEP SSB, 6 watts AM, 20 watts CW • **Spurious Suppression:** —50 db • **Carrier Suppression:** — 50 db on SSB • **Unwanted Sideband Suppression:** — 40 db • Features include VFO low frequency 1st conversion, with crystal controlled high frequency 2nd conversion for stability, filter type side-band generation and broadband circuits for easy operation.

RECEIVER: All-transistorized • **Frequency Stability: Highly stable;** utilizes same VFO as transmitter • **Sensitivity:** ½ microvolt or better for 10 db $\frac{S+N}{N}$ • **Selectivity:** 3.5 kc filter for both receiver and transmitter • **Audio Output:** 3.0 watts • **Spurious Suppression:** —50 db or better • **Image Rejection:** —50db (receiver and transmitter utilize double conversion) • Full RF amplifier with three tuned circuits for low noise figure, good selectivity. Separate RF and AF gain controls.

TRANSCEIVER: Both the receiver and transmitter are dual conversion, using 15 MC and 9 MC frequencies with a **hermetically sealed** crystal lattice filter. **Dimensions:** 8⅞" W., 4⅞" H., 7⅜₆" D. • **Wt.:** 10 lbs.-8 oz. POWER SUPPLY: **Dimensions:** (AC or DC) 8⅞" W., 4⅞" H., 5¹⅜₆" D. • **Wt.:** 13 lbs.-8 oz.

PRICE: TRANSCEIVER: $399.50 Amateur Net; POWER SUPPLY: AC—$67.75 Amateur Net • DC—$79.50 Amateur Net

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Net elected W6KMJ, pres. The Salvation Army Net is all ready for its annual work-out at the LA County Fair. The Eight Ball Traffic Net reports a traffic total of 208 in 46 sessions. WA6TAW is among the sidewinders on 2 meters here. W6GYH is back from a three-week 5000-mile vacation. K6LJ built up the old Hartley circuit for a 40-year-old 205-D tube then shipped it back to the ARRL museum after working some DX. WA6OPI is in uniform these days and getting ready to chime in with wedding bells. Many LA hams pitched in during the search for two boys lost in Baja, Calif. K6BPC is expanding with the addition of the new S/Line and RTTY equipment. W6NKR ran up 64,125 points in the July CD Party. W6JQB reports the overtime is slowing down at last and he is looking forward to spending more time in the ham shack. AREC nets are growing stronger each month. W6IBD reports that the antenna works better at 85 feet. The Emerson Amateur Radio Club has WB6LKV on the air. W6VOZ is deep sea fishing and hamming south of the border at XE2E. WA6GAG reports a new 220-Mc. rig on the air and 432- and 1230-Mc. antennas back in the air. Support your section net, Southern Calif. Net (SCN), 3600 kc. daily at 0300Z. Traffic: (July) W6WPF 1261, K6IWV 600, K6MDD 592, WA6TAW 269, W6QAE 239, WB6GZY 208, WA6TWS 193, WA6WTK 168, W6GYH 161, WA6WTX 142, WB6ECU 102, W6FD 04, K6GIL 93, WA6YEA 76, WB6FPQ 73, K6LDM 68, WB6BBH 63, WA6SNK 58, K6LJ 52, WB6GXI 43, WA6WIZ 43, WB6AJT 38, W6BHG 27, WA6WAR 14, W6MLZ 13, W6PCP 12, W6USY 11, K6YCX 11, WA6WXB 8, W6NKR 6, K6HV 4, W6JQB 4, W6AM 2, WA6DJB 2, WA6WJT 2, W6VUZ 1. (June) WA6GAG 28, WA6SNK 21, W6PCP 12, WA6CXB 11, W6JQB 4, K2PHF/6 2.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W6MHY is county coordinator and chairman of the San Diego Amateur Radio Public Service Corps. Committeemen are: W6BGF, e.w.; W6BKZ, 75-phone; K6QXN, 10-phone; K6UMC, 6-phone; WA6OSB, 2-f.m. phone; WA6TAD, 2-a.m. phone; WA6SJM, MARS; and K6BPI, RTTY. Asst. SCM W6EWU now boasts a Mohawk receiver and a Viking II. WB6IAR now has his 15-meter beam up. The 3825-kc. gang in San Diego County had a bang-up picnic at Felicitas Park near Escondido Aug. 16. We regret to announce W6FBF, as a Silent Key. A nice letter was received from W7SMB/6 and his XYL, W7VDH/6, who recently moved to Anaheim. She is putting out taped code practice on week nights on 146.6 Mc. at speeds from 4 to 13 w.p.m. This is a real service to the Technicians and Novices in the area. WA6ROF, ORS, started back to college in September. New members of the Orange County Club include WB6CQB, W6TIK, W6HYU, WB6FNO, WB6ITM, WB6FYW and WA6YRL. WB6KNN is ex-WA8EUH and DL4IC and is now active from Imperial Beach. With school now in session and vacations over, let your SCM know about your individual and club activities for this column. Traffic: K6BPI 7583, W6YDK 4902, W6IAB 4608, WB6JUH 909, W6EOT 344, WA6ROF 182. K6IME 55, WA6BDW 26, WB6KNN 25, WA6UUO 25, WA6WTD 24, WA6ZWR 24, WA6TAD 6, W6DGM 3.

SANTA BARBARA—SCM, William C. Shelton, K6AAK—WA6OKN is your new SCM as of Aug. 10. This will conclude over thirty years for me as a League Official. I have been active in League affairs since 1930 either as ORS, OO, OPS, SCM, Asst. Dir., etc. I plan to continue as actively as I can but because of business and health I must step down and assist in other ways. I have always been a strong supporter and will continue to support all the programs of the League. I plan to serve with Director Meyers as his assistant as long as he desires me to do so. I would like to conclude this final report with a heartfelt thanks to all who have assisted me in the performance of the SCM job. 73 and 30. Traffic: W7WST/6 296, K6AAK 52.

WEST GULF DIVISION

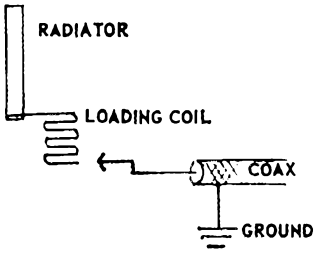
NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. PAM: W5BOO. RM: W5LR. The extreme heat in July seems to have put a damper on amateur activities in Texas. W5TOO invites you to come by the store and enjoy a cup of coffee in the cool comfort of the air conditioning. Recently about 15 hams brought their XYLs and had a small hamfest. W5DTA has resigned as Tex. C.W. Net manager because of his transfer to Lexington, Ky. Willie is to be congratulated on the fine job as net manager and we miss him. Good luck on your new assignment. WA5DQP assumed the duties of net manager Aug. 1. K7WJK, ex-W5KCQ, was a visitor in Ft. Worth recently. John is now located in Boise, Idaho, and is active on 20 meters. Look for him. W5HNG is being transferred to Puerto Rico and will leave about Dec. 1. W5BTZ, trustee of the General Dynamics ARC station, advises the club has another call, WA5-

(Continued on page 152)

HISTORY - AND THE BIG SECRET

It is an historical fact that the Gotham 23' base-loaded, all-band vertical antennas have been consecutively advertised in QST for a longer time than any other antenna, and perhaps consecutively longer than any ham product.

When a product is popular and long-lived we sometimes lose sight of those newcomers who are not familiar with the 'secret' of its design. Here is the basic circuit:



A single 50 ohm coaxial feedline (either RG8/U or RG58/U) connects to the resonant point of the loading coil for operation on 80 or 40 meters, at SWRs of close to 1:1.
On 20, 15, 10 and 6 meters, the loading coil is bypassed and loading is accomplished by the transmiter pi-network output or antenna tuner output.
Note that the antenna is not grounded, and that radials are not used.

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

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.

FREE CATALOG

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SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED.

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- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- 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.

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GOTHAM

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2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED. IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

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☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... $16.95

☐ 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

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Address.....

City.....Zone.....State.....

JZU, which will be located in the e.d. control room at the General Dynamics Plant. At this location they have a tie-in with the Tarrant County Sheriff's Department and the civil defense and county fire dept. WA5DWW has received his General Class license. W5UYH is back in town after an assignment in W2-land. Notice to Emergency Coordinators and other appointees: Please check your appointment date and send in your certificates for endorsement or your resignations. Traffic: W5DTA 477, WA5DQP 127.

OKLAHOMA—SCM, Bill Lund, K5KTW—Asst. SCM: Cecil P. Andrews, W5MFX. SEC: K5DLP. It looks like the "skip and QRM" has taken its toll this month on traffic. Message-handling and emergency work has to give way to amateurs who are not interested in "public service" work. If some of the fellows would use about one-tenth of their efforts that they use to QRM the nets on some public service work, we would have one of the greatest Emergency Corps ever. We could then use the other nine-tenths of the time for rag-chewing and experimenting. *Fellows, please listen on frequency before you put out a CQ or call, it will make all of our contacts more pleasant.* The newly-elected officers of the Edmond EARS Club are K5KRM, pres.; W5JCY, secy.; WA6JEK, treas.; K6CBA, activities. While helping to take down an antenna W8UTY/5 was injured when a section of the mast fell about 20 feet passing through his shoe and cutting about one-half inch off of a toe and cutting the same toe in another place clear to the bone. I understand that Chuck has a "tower," a TV set, a BC radio, an air-conditioner and some good-looking nurses to wait on him while he is in the hospital. New hams in Bartlesville are WN5KGK, WN5KGM, WA5KGN, WN5KHO and WN5KJB of near-by Dewey. K5OCN will be sending official Bulletins on 3780 kc. daily at 1815 CST. Traffic: K5TEY 271, K5KTW 39, W5MFX 34, K5DLP 22, WA5FLV 20, K5OCN 18, W5PML 12, WA5BNG 10, K5LZF 10, W5UYQ 10, WA5-FVJ 1.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. RM: VE6AEN. EC's: VE6SA, VE6SS, VE6ABS, VE6AJY, VE6AFJ. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA. OOs: VE6HM, VE6-NX. OBSs: VE6HM, VE6AKV. ORS: VE6BR. OESs: VE6DB, VE6AKV, VE6AJY, VE6MC. July activities: The International Hamfest was held at Apgar, Mont. July 18-19. Calgary AREC assisted with the International Air Show and did a very good job, had a station set up for Stampede Week, also had the biggest turnout for the Provincial AREC Picnic held at Carseland. The International Hamfest will be held this side of the border in 1965. The provincial ARLA now is in operation, fellows, and needs your support. Send in your membership and help all that you can. Write for information to the secretary, 1316 38th Ave., S.W., Calgary. What are you fellows around Edmonton and Red Deer doing? VE6AFJ still is on the sick list and only working c.w. Hope you fellows are all getting ready for the test in October. Traffic: VE6HM 227, VE6FK 16, VE6SS 6, VE6VA 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The Old Timers Night and QCWA Party was a great success. VE7BHH deserves a big pat on the back for the bang-up Saturday and Sunday. The pool side show was watched by 220 visitors. Again the B.C. boys bring in the bacon. VE7APF a v.t.v.m. and VE7AQW a solder gun at the O.K. International Hamfest. The BCEN Net, on 3650 at 0400 GMT, is looking for more stations like Vancouver. Our RM is VE7AGF. VE7QQ is our newest ORS. VE7AC received confirmation of 102 counties and now is DXCC officially. VE7QQ is now in Usk. Wonder if that is a new country. VE7AMW has been working from his summer home portable and now has 110. B.C. amateurs total 1500 as of Aug. 6, 1964. Our new YL, VE7BBS, is Mary Beth, age 16. VE7BCV must be a collector of radio parts, he never lets a bargain go by. Thanks for the letters and Form 1 cards received. Keep them coming. The Nanaimo Club and the William Lake Club are active on 6 meters. More activity has been heard on 11 meters of late. We must prove we are using it so let's make use of it. Traffic: VE7OM 49, VE7BHH 47, VE7AGF 45, VE7QQ 20, VE7-AC 19, VE7BHW 17, VE7BBB 14, VE7AMW 6, VE7DH 5, VE7AJK 3, VE7BEX 1.

MANITOBA—SCM, William H. Horner, VE4HW—We enjoyed meeting, both on the air and in person, many amateur radio visitors to our Keystone Province during the summer months. VE4AX has moved to Selkirk—good DX for the 6-meter gang. Ex-VE5TQ, from Saskatoon, is now VE4VA located in Westwood. VE4RO and VE4XO did well in the 5th Annual 160-Meter C.W. Contest. VE4LU and VE4SK are two of the new mobilers on 6 meters. VE4TP is putting out a potent mobile signal on 20 meters with his new Swan 400. VE4WS won the 75-meter transmitter hunt and VE4AE took

(Continued on page 154)

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the 6-meter hunt at the Kildonan Park WARA Picnic in July. VE4ZX says he enjoyed his recent European trip. It's nice to hear VE4KN back on the 75-Meter Net from Brandon. VE4GJ is settled in his new Charleswood home and will have a beam up soon. The final group of "call letter" license plates for 1964 has been issued and no further applications can be accepted until 1965. I would again like to remind you to send me your news items to make this column representative of all Manitoba. Your local club needs your help; attend the meetings and support their activities. Traffic: VE4JT 24, VE4QD 19, VE4HW 14, VE4QJ 8, VE4HF 7, VE4JY 7, VE4AN 4, VE4JA 4, VE4LQ 2, VE4SD 2.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. VE1AAC is now active on 50 Mc. from Halifax while VE1OW (ex-VE1AUC) is on the same band from Lunenburg. VE1CX, also active on 50 Mc., has been working into the Halifax area from Moncton. VE1NV has a new SB-300 receiver. The NBARA Annual Meeting was held recently at Grand Lake. Newly-elected officers are VE1RN, pres.; VE1CL, vice-pres.; VE1AJT, secy.; VE1AHV, treas. Deepest sympathy is extended to the relatives and friends of VE1AJ, who has joined the ranks of Silent Keys. This column is almost entirely dependent on club bulletins for items of interest. This, in the summer season, means a scarcity of news. There also is another problem. Club bulletins usually arrive at this office after the column deadline, resulting in considerable delay before appearance in print. A simple solution? *Yes!* Anyone with a newsworthy item should be interested enough to drop a note directly to the writer. Thanks. It is hoped that all have recovered from the effects of the Charlottetown Convention and are ready for the increased activities of the colder seasons. Traffic: VE1OM 13.

ONTARIO—SCM, Richard W. Roberts, VE3NG—VE3DCX of the Soo is back on the air on 75. VE3BD was a visitor to VE7-Land. VE3DLS was a witness to a shooting and a holdup while in his mobile. His urgent call on 144 Mc. was relayed to the local police and a squad car on the scene pronto. Your SCM spent his vacation in Maine. VE3BLZ was a visitor to Toronto and VE3AUH is back at Sunridge as portable. VE3FWA is heard on 2 meters. An Eleven-Meter Net is to be operating soon in the Metro area of Toronto. VE3DKR is EC. The London Club is very busy with the details of the Ontario Section ARRL Convention. This is to take place Oct. 2 and 3 in London. Can anyone help VE3AWU? He is looking for a copy of the schematic for a 53 Army transmitter. VE3AXQ, in Peterboro, is now VE3XQ. Sarnia has two new hams. Welcome to VE3FVX and VE3FVY. VE3EMF is joining the Peace Corps as a teacher. Ed has an s.s.b. transceiver and expects to use the call VS4EB. From Ft. William we hear that VE3ECK is working in VE7-Land. VE3GS is in the hospital in Ft. William. The SKywide ARC of Toronto elected VE3AUR, pres.; VE3FEI, vice-pres.; VE3FWA, rec. secy.; VE3CMK, treas.; VE3DHO, corr. secy. VE3DMU has moved from Downsview to Ottawa. The Grey Bruce Net is in full swing. Its QNI was 259 for the month of July. The RM is VE3DPO. The Roblin ARC of Toronto elected VE3HW, pres. and VE3FO as vice-pres. VE3BWM has returned to North Bay. VE3EGG was active in the latest CD party. VE3BDX reports that 6 is open for DX some evenings. In nine days mobile he logged 53 stations, one of which was a KP4BEO. The Ontario S.S.B. Dinner will be held Nov. 21 in Toronto. Tickets may be obtained from VE3GH. Traffic: VE3EHL 114, VE3FGV 78, VE3NG 78, VE3DRF 75, VE3DTO 70, VE3DVE 40, VE3BTV 28, VE3BUR 28, VE3AKQ 26, VE3CLK 25, VE3ETM 17, VE3CFI 13, VE3BLZ 11, VE3DH 7, VE3EBC 7, WA8-ETX/VE3 6.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. VE2FY had a memorable trip to the N.Y. World's Fair by water. He took part in a rescue operation and had the radio knocked out by lightning. VE2AUU went by car to Florida and visited the Fair on the way back. VE2JJ says: "Maybe back to Labrador again soon." If you hear W1HPB/VE2 he is located 50 miles from Senneterre in the wilderness. VE2ALE handled much traffic for VE2AT/2 at Donne Memorial Camp. Another camp-dweller was VE2BRT/2, at Lac Gemont. The annual Burlington Hamfest was well attended by VE2s and many of the boys carried away fine prizes. VE2BUP is fixing the station for more convenient operation. VE2CCN is an amateur club at Nicolet. VE2BTF found his new quad very productive. VE2QG is recovering nicely from a disc operation. VE2AIM, VE2ABJ and VE2VE are busy on 2 meters. VE3RZ, signing /VE2, puts out a potent signal from his summer residence at Wakefield Lake. VE2FX and VE2ABZ are owners of beautiful yachts and VE2JZ enjoys sailing on Lake St. Louis. VE2AQJ does fine QO work. Félicitations à VE2ALH, pour sa nomination comme opérateur du mois. VE2BJV a donné

(*Continued on page 156*)

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
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une demonstration sur la radio amateur, sous les auspices de la ville de Montréal. VE2ABT est un autre nouveau sur OQN. VE2AWR vient de terminer de construire son mobile, avec de tres bons résultats. VE2JC et VE2DN viennent d'arrêter leurs activités pour deux mois de vacances. Traffic: VE2BEZ 138, VE2DR 118, VE2ALE 101, VE2BMS 45, VE2SD 44, VE2AGQ 43, VE2OJ 43, VE2EC 28, VE2JJ 23, VE2BCB 18, VE2BHH/2 18, VE2HV 16, VE2BRT 2 14, VE2BUP 3.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—New equipment: VE5EQ and VE5EW with a Health HW-12 and VE5TX with a new beam and tower. VE5SN now is on the air, thanks to help from the Saskatoon gang and most especially VE5EG, who donated a DX-25. VE5IG is now *in* as well as *on* the air with his new flying machine. VE5QC just about had a nervous breakdown. Got in an HT-44, an SX-117 and Galaxy III, hooked them all up, then came down with the flu which left him home from work. Perfect—but tragedy—he lost his voice! EC VE5HQ, of Saskatoon, reports that the SARC hams provided communications for the Travellers Day Parade. All went without a hitch. Those taking part: VE5LM, VE5LG, VE5MG, VE5MK, VE5MI, VE5CU, VE5HJ and VE5HQ. AREC members included had good training. Don't forget when climbing those towers and roofs to have somebody with you; we want you around this winter to help QRM the DX. Traffic: VE5HP 38, VE5LM 22, VE5HQ 7, VE5CB 2, VE5LA 2.

Who! Me?

(*Continued from page 64*)

large we are poor linguists: we haven't grown up with a great need of languages other than our own — but is this a full and sufficient excuse for placing the full burden of communication on the other fellow?

As a beginning, each of us could at the least speak quite slowly and distinctly, abandoning "vague" slang expressions, and making a point of commending our foreign friend for his English ability. As a second step, we could obtain a beginner's dictionary in any particular language, and try some words of greeting or cheery wishes of farewell. Anyone who has tried this, knows what a splendid and happy response it brings from the foreign ham; and with so little effort on our part.

With foreign contacts, the usual common-sense rules of decency and courtesy prevail under all circumstances, only more so. It's easy to misunderstand under handicaps of QRM and language difficulties. Put yourself in the other fellow's position. If you haven't listened on a DX band outside of the United States, you don't know what QRM is! Get the chip off the shoulder.

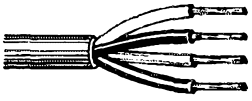
Want to try some other ideas to extend a helping hand? What have you been doing with old callbooks, handbooks, radio magazines, technical books and electronic literature? Ever try shipping one to a DX contact — if he doesn't need it, he surely knows a local ham who does. What's doing in the ole junkbox? If your QSOs are more spirited than the report-exchange type you will darn soon learn what small parts will be of immeasurable help to your fellow ham overseas. We can export a lot more than our QSL cards if we care to make a minimum effort.

Hundreds of possibilities present themselves each day for thousands of hams to extend friendship from America overseas; and the examples presented here only suggest the variety of opportunities for service available to you. This is no handout procedure: look on it as a personal U.S.

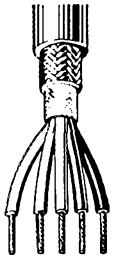
(*Continued on page 158*)

Belden Wire and Cable for every ham application

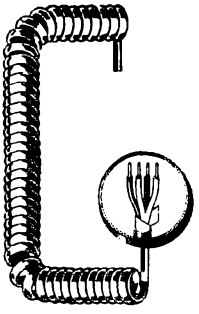
service rated—quality controlled easy-to-use packaged lengths



Antenna Rotor Cables. Sturdy, flexible, plastic insulated cable for all Ham antenna rotor applications. Color coded for easier hook-up. Chrome, vinyl plastic jacket resists sun and aging.

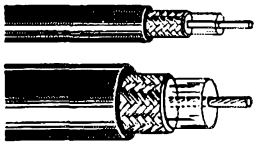


Power Supply Cables. Provide dependable service as power supply cords, interconnecting cables on electronic equipment, remote control circuits, special press-to-talk microphone circuits, and other ham applications. Designed for long service life with excellent mechanical and electrical characteristics, and uniform quality. Special jacket offers maximum resistance to abrasion and ozone.

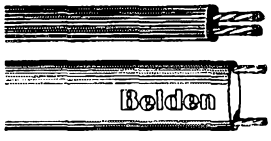


Coiled Microphone Cable. Provides low impedance for mobile microphone applications. Black neoprene jacket remains flexible at low temperatures. Available with or without shielded conductors.

Shielded Hook-up and Grid Wire. Provide most effective TVI suppression. Vinyl insulated with tinned copper braid shield. Available in wide range of capacities from 24 AWG to 12 AWG.



Ham Transmission Lines—75 Ohm Foam Core RG/U Type. Designed for lowest losses, longer service life, and maximum dependability. Cables are essentially flat with no peaks in attenuation to reduce signal on either high or low frequencies.



Ham Transmission Lines—Parallel Type. Made with brown virgin polyethylene for best weather resistance and lowest losses. Uniform quality control prevents standing waves and mismatches.

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8-2-3

ham-friendship project. A little effort on our part solves a problem of great magnitude to a foreign ham.

We have the choice of being friendly ambassadors or ugly Americans to our numerous listeners overseas. We have no choice about our role as ambassadors — each time we transmit, our PS is received loud and clear around the world. The one thing we as radio amateurs can accomplish with exceptional excellence on the international level is the creation of foreign friendships. When we thus serve the cause of world friendship, we best serve the cause of amateur radio, both here at home and abroad. QST

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

K1FYH, Donald C. Rousseau, Gardner, Mass.
W1KWX, Frank J. Padykula, Chicopee, Mass.
W1PXQ, Richard W. Hannah, Arlington, Mass.
K1ZG, Lawrence DeMattia, Stonington, Conn.
W2DIO, George A. Zarrin, Brooklyn, N. Y.
WA2FRN, John W. Merrill, Troy, N. Y.
WA2SOM, Frank J. Pennacchio, Saddle Brook, N. J.
W2VO, Harold E. Jordan, Briarcliff Manor, N. Y.
K3AJL, James H. Warner, Berwick, Pa.
W3FCY, Charles F. Hartsock, Silver Spring, Md.
W3GLX, Winfield G. Beck, Sykesville, Md.
W4BCU, John A. Wiegand, Anniston, Ala.
W4PVP, Robert G. Preston, Hollywood, Fla.
K4UFW, Lawrence C. Brown, Homestead, Fla.
WA5CSG, Hugo V. Meisner, Fort Smith, Ark.
W6GRT, Warren G. Hoyt, Woodland Hills, Calif.
W6HF, Joseph N. De Lorenzo, Los Angeles, Calif.
W6JUM, Scott W. Ewing, Bishop, Calif.
W7AIV, David S. Curtis, Jr., Phoenix, Ariz.
W7KCT, William C. Miller, Provo, Utah
W8HND, Robert A. Landre, Menominee, Mich.
WN8JFZ, Fred H. Graham, Akron, Ohio
W8JMR, Apolonius A. Wloszczuk, Hamtramck, Mich.
W8REK, Kenneth S. Barber, Clarkston, Mich.
K8TIX, John R. Ferris, Manistee, Mich.
W9EOX, Lyell J. McDonald, Elkhart, Ind.
W9JZZ, Thomas A. Jenkins, Wilmette, Ill.
WA9LAO, Frank E. Delbridge, Chicago, Ill.
W9OZR, John A. Evans, Elm Grove, Wisc.
W9PNB, Oliver G. Johns, Elmhurst, Ill.
W9QYQ, Frank M. Carroll, Orleans, Ind.
W9SEV, Paul F. Davis, Ottawa, Ill.
WØIXI, Leo E. Drescher, Mankato, Minn.
WØQGG, Jim Gilbreath, Chanute, Kans.
KW6ED, George E. Printz, Wake Island
VE7YT, Charles H. Bradshaw, Trail, British Columbia, Canada

IMPORTANT NOTICE

Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying, please give old as well as new address. Your promptness will help you, the postal service and us. Thanks.

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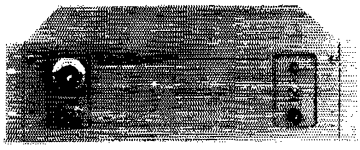

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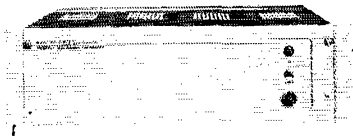
Teleprinter-to-Morse Code Converter
for Simplified Morse Code Operation

Morse to Teleprinter Converter
for Simplified Morse Code Operation

MODEL 670

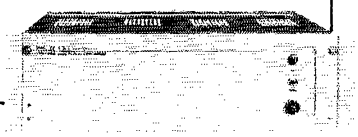


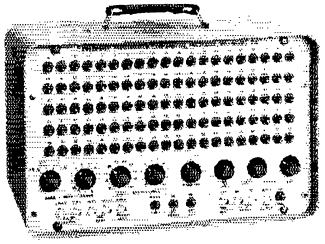
MODEL 700

5 Level to 8 Level Converter
provides interface between standard 5 level Baudot circuits and the new 8 level ASCII

8 Level to 5 Level Converter

MODEL 701





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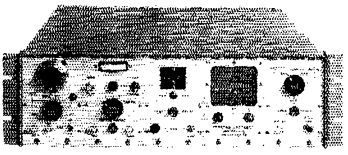

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Data Transmission Test Set
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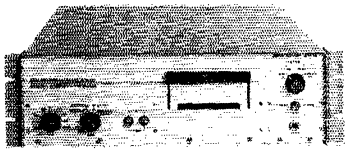

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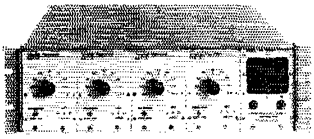
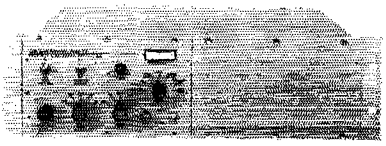


MODEL 651A

Code Speed Converter
provides interface between teletypewriter circuits operating at different baud rates



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Amateur Radio Public Service Corps

(Continued from page 86)

and with all roads and bridges washed out. W7BI flew into the isolated community of Essex to provide communications. W4WNY/7 and K7SIL also did some flying but they went to Browning, another isolated area. W7BOZ and K7EGJ departed in the early morning of June 9 to the Sun River and Fort Shaw area to help evacuate flooded families. They also reported on flooding conditions in the area to W7KUH who in turn relayed the information to the Weather Bureau. W7YIO and W7ZUQ operated from their homes in the flood area near Ft. Shaw and reported river conditions and high water. They were forced to leave on June 9 because of severe flooding. K7PKW drove to the Teton River and reported flooding conditions in this area. Important river information, passing of the crest and weather information were also relayed. W7WYG and K7REZ, both mobile, went to the Vaughn, Mont., area to report flood conditions. They requested helicopter help to evacuate stranded persons. K7PQM set up a portable station at the Great Falls police station and dispatched mobiles in the Great Falls and lower Sun River area.

W7KUH said in his report, "all amateurs, whether belonging to RACES or AREC or those not affiliated with any organization, worked together. Through this fine cooperation, much valuable emergency and welfare traffic was handled. Many lives were saved by amateur radio. There was no confusion in the amateur ranks and all traffic was handled in an excellent manner. The frequencies were kept clear of non-essential traffic. Many stations stood by to handle emergency traffic and should be commended as well as those who actually participated."

Other stations who participated and were not previously mentioned: *W7s* AFM AMK AU AYH BFW BIS BOV BXL CCZ CGG CJE CJN CPS DXK DWR EEO EWR FGZ FL FTD HGM HIZ HQT HXC IBG IGQ IWW JGG JHM JZW KJX MM NPV OEB OIQ PAF PF PWY QVD SZY TCK TDW TYN UGM UWY VIK VOX WCT WFV WSW YHC YHS YWE, *K7s* AEZ AJQ BYB CCZ DCH DCI DGR DGV EGA FDY IAY INR IOA JZO KLE KME LDZ LUH MGX MOY MSB OPZ OQX OUV OZU PKV PWW PWY QKN QLP QVD SVR TDD UAZ UON UPH VIP VRY VUE WNE UNZ ZJD, K4ROK/7, K9LLF/7 and WØWWL. — *W7KUH, SCM Montana.*

— • • • —

On June 15, the Department of Fisheries research vessel *Black Douglas* was without communications. KP6AZ, who was on board, established contact with W6AV in Oakland, and was able to pass fishery information and oceanography data to the proper parties.

— • • • —

On July 23, a construction worker in Lake County, Minn., suffered a heart attack and drove the truck he was driving into a ditch. WAØAWZ, who was near the scene, contacted KØHKA and requested that an ambulance be sent. Despite all efforts, the patient was dead on arrival at the hospital. — *WAØAWZ, Asst. EC Lake County, Minn.*

— • • • —

On July 25, nine amateurs provided communications for a 48-hour search for a lost hiker on Mt. Lemmon, Ariz. Two meters was used as the primary means of communications. Those amateurs taking part were: *W7s* GFQ DRU SQX, *K7s* CRO CET IBX QOL QCW RKC. — *W6MLZ, Director Southwestern Division, ARRL.*

— • • • —

On Aug. 11, at 1700Z, the District of Columbia ARPSC was alerted by W3CVE, Maryland-D.C. SEC. A three year old child had been lost in Randolph Hills, a subdivision of Montgomery County, Md., since 2200Z, Aug. 10. A liaison circuit was set up on 6 meters between K3YJE and K3YKC while W3CVW and W3CJT maintained contact on 80 c.w. At 1830Z the child was found drowned near her home, the net was secured at 1900Z. — *W3CJT, EC District of Columbia.*

— • • • —

One SET a year isn't enough for the boys in Florida; they have to throw one in the spring, too. This year it was on May 16, with SECs W4IYT and W4MLE doing their usual superb job of planning, executing and reporting. The test simulated a series of tornadoes, first at Marianna, than at Ocoee, then at Jupiter and finally at Naples. Only the ECs in the counties directly involved knew in advance

(Continued on page 162)

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We gave the Hams in California an opportunity to show that they were proud to be part of the Amateur Radio Society — now here is an opportunity for all of you to join.

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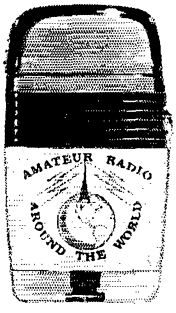
The key chain or bracelet is in heavy wrought durable metal in a 3-d style that is instantly recognized as "quality." The VU-LIGHTER has the See-Through Reservoir with the Amateur Radio Around the World on one side and your **call letters** on the **reverse side.**



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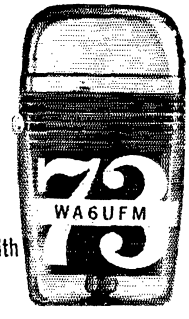

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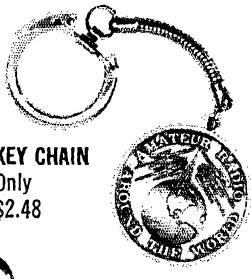

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exactly what would happen, and even they didn't know what would happen elsewhere. "Disaster area" ECs operated only on emergency power, and each generated a pile of simulated disaster traffic to as many outside destinations as possible, much of it requiring answers. Key cities became focal points for outgoing traffic and collecting points for traffic coming in.

EC WA4DED of Jackson County (Marianna) used every amateur in his county, plus a number of unlicensed persons, and enlisted the cooperation of radio stations, the sheriff, city police, Red Cross, civil defense and several other agencies. Palm Beach County EC W4GWF (Jupiter) reported a successful exercise, including cooperation from adjoining Martin County. Collier County EC W4ACT (Naples) reported full cooperation of all agencies and several other communications services and says "I was pleased." The operation at Ocoee, just west of Orlando in Orange County, practically became a part of the Orlando Key City operation and was handled mostly through mobiles and v.h.f. working directly to Orlando. EC W4NKD reported full cooperation of both c.d. and Red Cross, both locally and from state headquarters.

Key City performance generally was good. K4SMB at Pensacola in particular did an excellent job, and said that three times the traffic could have been handled with ease. Mobiles were used to transfer some of the traffic from station to station within key cities. The various Florida nets were in full swing and operated pretty much according to schedule.

Naturally, all was not peaches and cream, and a great part of the five-page report is devoted to critique which will enable a better performance next time, which will be in the October nationwide SET. We again doff our hats to the boys in Florida for a tight ARPSC setup which really works.

—•••—

Thirty-six SEC reports were received for June representing 16,964 AREC members. This is the same number of reports as we had last year but with a slight drop in total membership. Those sections reporting were: E. Mass., Colo., Minn., Wash., N.C., Nev., Ind., Ala., Alta., Ohio, Maine, Okla., 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, Los A., Miss., E. Pa., Nebr., W. Fla.

Here we are again at the half way mark for 1964 (my, hasn't the year gone fast?). This year we have received 230 reports from 48 different sections while last year we had 245 reports from 49 different sections. Here are the sections that have reported 100-percent for 1964 so far: E. Mass., Colo., Minn., Wash., N.C., Nev., Ind., Ala., Alta., Ohio, Maine, Okla., 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., Iowa. Our congrats to these SECs. Keep it up fellows. For those SECs who haven't turned any reports or only a few, is it really that hard to fill out the form? Let's go gang, Public Service is number 1 now, ya know. QST

Correspondence From Members

(*Continued on page 104*)

brings out a lot of poor operating practices which certainly can be heartily condemned. I mention some of these practices in the hope that the guilty ones will cease and desist.

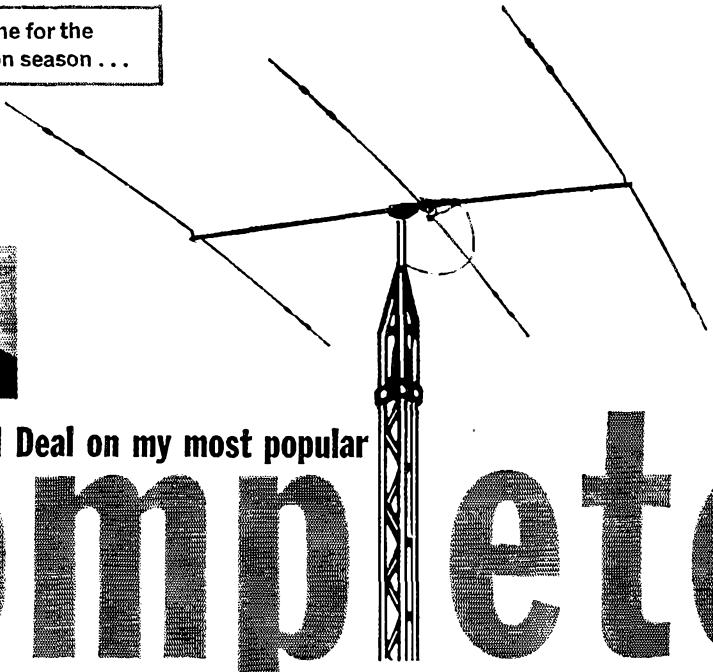
Overmodulation: Out in the field it is difficult to judge one's voice and the tendency is to shout into the "mike" with its resulting overmodulation. Keep the voice down or watch your meters.

Identify your call letters in accordance with FCC rules. Too often phonetics are used without repeating the call letters as a complete phrase. Since field operating conditions are not too good, signal strengths are down which requires a more complete call sign identification.

"Q" and "S" signal reports are tossed around in such profuse quantities that any one with a grain of common sense would know that the reports are quite meaningless. It seems that there is nothing below Q-5, even though someone asks for a couple of repeats. As I get it Q-5 means perfect reception. By

(*Continued on page 164*)

Just in time for the installation season . . .



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far the majority of reports should be in the Q-3 or Q-4 catagory.

I would like to point out that message traffic should be permitted preference over Field Day contacts. During this last Field Day I noticed, at least twice, message traffic interrupted with a loud and racous "CQ Field Day" During Field Day it is still good practice to listen on the frequency before calling "CQ".

I believe that Field Day contacts could be a lot more interesting and desirable if a little more time were spent to get a real message across, such as handle, name of town and, at least, type of antenna in use. Let's hope that the next Field Day will be somewhat more in line with what "Ham Radio" represents, instead of reminding one of a Sunday traffic jam with a lot of horns blowing and "no one getting anywhere fast". — *W3FFR*

How's DX?

(Continued from page 95)

Dale wearily reports that getting into some of these new factory rigs is like entering Fort Knox uninvited . . . . . "Worked ex-VP8GQ as G3LET," notes W8YGR. "Peter says that Britain's summer heat almost killed him after his long stay in the antarctic icebox." . . . . . The Boy Scouts 7th Jamboree-on-the-Air comes off on the 17th-18th of this month. Their World Bureau station at Ottawa, VE3WSB, will haunt 3670, 3790, 3805, 3850, 7190, 7290, 14,130, 14,195, 14,210, 14,310, 21,195 and 21,350 kc. using c.w., a.m. and s.s.b. Other participating Scout stations will be heard on other frequencies world wide . . . . . K3HTZ practices his German in schedules with DM3ZOL, recommending this phase of DXing to any language buff . . . . . The new "Q-Dial" operating aid rigged out by W9IOP of Electro-Voice is a one-piece DX encyclopedia . . . . . Forty-meter DX connoisseur W9NN warns archrivals W8s FGX and JIN, "Added new secret weapon to my old vertical. Have the lads stand back and observe." (Quick, Jeeves—the binoculars!) . . . . . XE1NE mingles gracefully with the 14-Mc. phone crowd using a mere 25-watt 6L6 rig on 14,110 and 14,310 kc. Alberto, licensed since '26, previously signed XE1s AW GG and PP. He's XE1PNE when mobile . . . . . W8EQA is trying to scare up a good TR-switch and some spare components for newcomer VP2AX . . . . . Local dispatches via club newshawks: VP1s JF and TA, the latter on 14,049 kc. at 0300 GMT, hold down the B.H. c.w. fort. VP1TA seeks to rejuvenate the local ham club to pep things up. . . . PY2PE & Co. may make it to Trindade at any time now. . . . That Socorro stunt is also imminent, so pass up no hurried Mexican Fours. . . . W6s CBE VVR WX ZMW and K6OHJ ganged up on the dictionary to turn out NCDXC's *DXer* pending designation of a permanent editorial staff. QST

DX Competition Results

(Continued from page 33)

W9WIO.....1404- 26- 18- B- 4
WA9EOS....1178- 19- 21- A-15
K9BJM.....780- 13- 20- C- 4

Indiana

K9PNV...109,242-126-289- C- -
W9WHM...33,696- 78-144- C-21
W9NKB...27,090- 86-105- -- -
W9CWO....7353- 43- 57- B-12
WA9BWY....189- 7- 9- A- 2

Wisconsin

W9GIL....52,128- 96-181- C- -
W9GMY...14,326- 58- 83- C-40
W9WJH.....3627- 31- 39- A- 6
W9HHX (K9s FEW UQN, WA9GZU).8112- 39- 70- C-25
W9YT (K9s ELT OPF) 3308- 29- 38- C- 8

DAKOTA DIVISION

North Dakota

WØHSC (KØGBA, WAØFWC) 5841- 33- 59- C- -

South Dakota

WØCUC.....4050- 30- 45-BC- -

Minnesota

WØKUI.....3- 1- 1- B- 2
WØQUU (WØs NGF QUU) 67,872-112-202- C-90

DELTA DIVISION

Arkansas

WA5CBL...38,340- 90-142- C-29
W5LCI....17,985- 55-109- C-16

Louisiana

W5AJY...100,188-132-253-AC-44
W5KC.....32,160- 80-137- C-36

Mississippi

K5MDX...90,342-126-239-AB-29

Tennessee

WA4AWG..41,580- 90-154- A-50
WA4CGA..25,690- 70-126- B-37
W4IGW.....1152- 16- 21- A-15
WA4DCP....6435- 39- 55- C- 8

GREAT LAKES DIVISION

Kentucky

W4BCV...229,671-169-453- C-74

(Continued on page 166)

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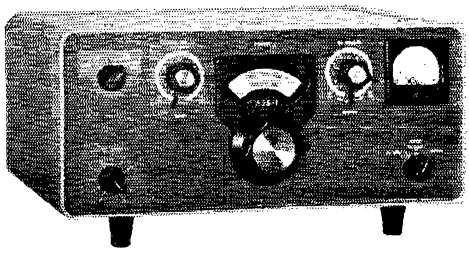

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MP1 12V DC Power Supply	198.00
PM-2 Power Supply	150.00
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W8ARH....52,416- 91-192- C-35
W8HUD....37,056- 64-193- --30
W8QFM....30,940- 68-152- C-56
W8EGR....24,780- 59-130- C-25
WA8CZH..23,400- 65-120- A-36
W8WT.....18,081- 49-123- C-47
W8GG.....4140- 30- 46-AC-20
W8EW.....1710- 19- 30- C- 6
W8DGP....1380- 20- 23- A- 8
W8QQL.....243- 9- 9- B- -
W8TJQ.....216- 8- 9- A-13
W8NWO (4 oprs.)
337,428-206-516- C-96
W8NGO (4 oprs.)
161,820-145-372- B-80

Ohio

W8IJZ....65,520-104-210- B-40
W8BMX...39,546- 78-169- B-57
W8WUO...28,329- 71-133- C- -
W8WC....27,360- 76-120- B-18
W8JFD...20,646- 62-111- B-14
K8DWQ....6549- 37- 59- C-20
K8LNL....5880- 35- 56- B-22
K8WVF....3726- 27- 46- C-19
WA8HXR...1404- 18- 26- A-15
WA8EWT...1056- 16- 22- A- 9
W8GMK....1035- 15- 23-BC- 4
K8KTL.....624- 13- 16- B- 9
K8NMG.....378- 9- 14- B- 3
W8NPF.....363- 11- 11- C- 6
K8ZPK.....243- 9- 9- C- 3
WA8ETX.....27- 3- 3- A- -
WA8ETW.....12- 2- 2- A- -
W8AJW.....3- 1- 1- A- -
W8LT (K8s JZZ PMW)
36- 3- 4- C-18

HUDSON DIVISION

Eastern New York

WA2OUO..58,236- 92-211- A-65
K2GDP....52,065- 89-195- B- -
K2JMY....27,885- 55-169- C-34
K2MPS....8651- 41- 71- B-13
WA2RUD...1890- 21- 30- B- 6
W2VIR....660- 11- 20- C- 3

N. Y. C.-L. I.

W2WZ....161,046-138-389- C-45
WB2BWV..14,250- 50- 95- B-15
W2GKZ....9900- 44- 75- C- 9
W2AYJ....4794- 34- 47- C- 4
WB2KFO...3726- 27- 46- A-35
WA2RMP...1845- 41- 15- -- -
W2CWD....1701- 21- 27- C- 3
WA2TKL...1580- 20- 27- B- 8
W2JB.....240- 8- 10- A- 8
W2NRI.....48- 4- 4- A- 8
WA2YJN....48- 4- 4- A- 2

Northern New Jersey

K2HLB²...423,134-216-657- C-88
W2VJN....61,884-108-191- C-25
K2SUX....46,560- 80-194- C-25
W2JSX....43,860- 86-177- B-40
W2FFQ....27,084- 61-148- B-62
WA2PWL...24,186- 58-139- A- -
W2PBZ....10,962- 42- 87- C-28
W2YTH....1188- 18- 22- C- 4
W2OXG....1008- 14- 21- C- 5
W2MNW....208- 8- 9- A- 8

MIDWEST DIVISION

Iowa

WØLBS....18,180- 60-101- C-45
WØFDL....8658- 39- 74- C-10

Missouri

WØLBB....42,930- 90-158- B-46
WAØAJV...12,201- 49- 83- A- -
KØJPL....8640- 40- 72- B-16
WØUCK.....363- 11- 11- A-12
WØGUV.....27- 3- 3- B- -
KØBJK (KØs BJK DUB, WØNFA,
134,274-139-322- C-34

NEW ENGLAND DIVISION

Connecticut

W1BIH....89,661-121-247- C-29
W1OKG....46,698- 86-181- C-39
W1QV.....9600- 40- 80- C-12
W1DIT.....516- 13- 14-BC- 9

Maine

W1GKJ....96,033-119-269- C-50
W1BFA.....6240- 30- 70-BC-15
K1VXK.....4620- 22- 70- A-41

Eastern Massachusetts

K1IMP....87,672-104-282- C-32
W1JYH....61,110-105-194-AC-26
W1YQF....21,294- 42-169- A-72
WA1ANR...12,285- 45- 91- A-17
W1MRQ....9555- 35- 91- C-12
K1KTH....6624- 32- 69- -- -
W1PLJ....3525- 25- 47- B-24
W1KXP....1575- 15- 35- A-15
W1MO.....429- 11- 13- A-10
K1WGM (K1s WGM ZHS)
8505- 35- 80- B-27

Western Massachusetts

W1RF.....49,748- 67-252- C-23

New Hampshire

W1FZ.....78,336-102-256- C- -

Rhode Island

W1AWE....5760- 32- 60- --27

NORTHWESTERN DIVISION

Oregon

W7DLR....1275- 17- 25- C- 4
K7VYU....1020- 17- 20- C-18
W7BTH.....612- 12- 17- C- -
K7SCH.....3- 1- 1- A- 1

Washington

K7QWI....4089- 29- 47- C-22

PACIFIC DIVISION

Hawaii

KH6FBJ....32,589- 71-153- C-33
KH6EPW...22,794- 58-131- C- -

Santa Clara Valley

K6OHJ...115,656-122-316- C-72
K6ERV....91,060-116-262- C-60
WA6GFV³..63,960-104-205- C-35
W6WX.....59,388- 98-202- C-36
WA6QGW..54,978- 98-187- B-50
W6LCF....31,536- 72-146- B- -
W6UMI....25,728- 67-128- C- -
W6JKJ....20,544- 64-107- C-25
K6HOR.....1326- 17- 26- C- 7
WA6TGY....612- 12- 17- C- 2

East Bay

K6AHV...101,625-125-271- C-70
W6BSY....42,720- 89-160- C-45
W6PQW....10,206- 42- 81- B- -
KL7DTB/6.10,206- 42- 81- C-20
W6LDD....8520- 40- 71- C-13
W6FLT....2898- 21- 46- C-10
WA6UUS...1728- 16- 36- B-18
W6KG.....945- 15- 21- C- 4
K6LZI.....90- 5- 6- B- 1

San Francisco

W6WB....29,025- 75-129- C-30
W6YEJ....7280- 40- 62- A-31
K6IXS....5880- 35- 56- C-23
WA6AUD...2070- 23- 30- A-12
K6NCG (W1FAI, K7MZC)
4611- 29- 53- C- 8

Sacramento Valley

W6GRX...53,289- 93-191- C-60
W6GVM....630- 10- 21-AC- -

San Joaquin Valley

WA6SBG...72,921-109-223- B-52

ROANOKE DIVISION

North Carolina

K4QVK....21,248- 64-114- A-25
WØFPA/4..11,286- 38- 99- B-33
W5GPS/4....3588- 26- 46- B-14
WA4CJV....1500- 20- 26- C- 6
WA4FFW....896- 14- 22- A-11
WA4MLV....387- 9- 14- A- 8

South Carolina

K4MUP....360- 10- 12- B- 3

(Continued on page 168)

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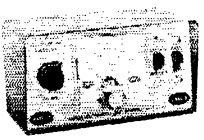
BULLS EYE BUYS AT ARROW



AMECO PCL, 6-160 METERS ALL BAND NUVISTOR PRE-AMP

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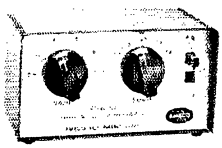

AMECO MODEL BIU BRIDGE INDICATOR UNIT

Model BIU, when used with the Ameco SWB or other make of bridge, will accurately read SWR, percentage power and percentage voltage (3 scales). Contains a sensitive 100 microampere 2⅛". D'Arsonval meter. Unique switching circuit provides for reading either one of 2 bridges. Charcoal grey cabinet with satin copper panel, 2¾" x 5" x 3". Wired and tested. **$15.95**

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High quality bridge accurately reads SWR's from 1.8 to 225 mc. (including ham, CB and commercial bands). Can handle up to 1 KW. Uses inductive coupling and can be left in the line continuously without insertion loss. Contains two SO-239 VHF connectors. Satin copper case, 1⅝" x 2¼" x 4½". Wired and tested. **$9.95**

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50-54 Mc. & 144-148 Mc. Xtal (8 Mc) controlled or can take VFO. Meter reads final grid or cathode current or RF out. Built-in, solid state power supply, fused. Mike Key jack & xtal socket on front panel. Size: 11½x9½—6" high, shipping weight approx. 20 lbs.

TX-62, wired and tested **$149.95**

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Model 4111/RV
Amateur Net **$1.95**

actual size

PRECISION BALL DRIVE DIAL

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PRECISION PLANETARY-VERNIER for exceptionally fine tuning

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$1.50 ea. **10 for $13.50**

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Virginia

W4BVV...347,454-194-597- C-85
W4KWY...240,300-178-450- C- -
W4NJF....79,461-109-243- - -62
K4WHD....49,608- 78-212- C-34
W4OPM...36,960- 80-154- C-36
W4OM.....26,130- 65-134- C- -
W4LRN....23,622- 62-127- C- -
K4ASU....23,058- 61-126- C-10
W4HVU....22,713- 67-113- B-19
K4VWH.....3741- 29- 43- B-20
W4WBC.....396- 11- 12- C- 3
W4ZM.....108- 6- 6- - - -

West Virginia

W8UMR.....1188- 18- 22- A- 4
W8MLX.....405- 9- 15- A- 4
W8GIO (W8GIO, WA8AOW)
24,696- 56-147- C-55

ROCKY MOUNTAIN DIVISION

Colorado

WØEZO.....4752- 36- 44- B- 7

Utah

W7DQM...24,156- 66-122- C-40
K7OXB.....1305- 15- 29-AB- 8

New Mexico

W5LEF....43,200- 90-160- C-41
W5NXF.....3276- 28- 39- B- 8

SOUTHEASTERN DIVISION

Alabama

W4RLS....211,224-156-452- B-70
W4PRP...173,952-151-384- C-70
W4DS.....15,840- 60- 88- C- -

Eastern Florida

W4HKJ....71,577- 99-241- C-36
W4ZYS....67,080-104-215- C-46
W5LLB/4..60,885- 99-205-AC-38
K4YFQ....15,180- 55- 92- A-14
W4EEO.....5292- 42- 42- C-24
W4KJL.....4770- 30- 53- A-22
W8CHZ/4....2706-22- 41- B- 9
K4EJ.....1539- 19- 27- B-11
K4RQE.....1140- 19- 20- B- 2
WA4HFB.....270- 9- 10- B- 8
WA4SMP.....175- 7- 9- A- 8

Western Florida

K4ZJF.....24,660- 90-158- C-62
WA4FIJ....11,760- 49- 80- C-19
W4SHW.....648- 12- 18- A- 5

Georgia

K4HYB (WA4s ARV GAP QPQ)
22,656- 64-118- A-54

SOUTHWESTERN DIVISION

Los Angeles

W6RW4...141,705-141-335- C-38
W6LDA....49,632- 88-188- C-47
W6PKK....33,480- 72-155- C-43
W6YMV...27,594- 73-126- C-36
WB6BBT..20,544- 64-107- B-50
K6SOK.....3675- 25- 49- C-10
W6BUD.....3240- 24- 45- C-12
WB6BEE....1326 -17- 26- B- 6
W6FET.....966- 14- 23- C-10
WA6KNE....627- 11- 19- B- 6
W6APH.....264- 8- 11- A- 5

Arizona

K7TNW.....672- 14- 16- B- 7
K7VMO.....342- 9- 13- A- 4
W7ENA.....27- 3- 3- A- 3

San Diego

W6LCX....59,655- 97-205- C-65
WA6SBO...35,784- 84-142- C-16
K6AVF.....9900- 44- 75- A-43
WA6WPG...2730- 26- 35- A-20

Santa Barbara

K6AEZ....23,363- 61-128-AB-60

WEST GULF DIVISION

Northern Texas

W5KTR...110,430-135-273- B-69
WA5ALB...36,540- 87-110- A-45
W5IPH....19,089- 63-101- C-30
K5QMC....13,932- 54- 86- C- -
W5EGS.....4590- 34- 45- B-18

Southern Texas

K5JZY.....83,898-118-237-AC-73
W5EDX.....972- 18- 18- A- -
K5HRR[6].....756- 14- 18-AC- 3
WA5HEK (WA5s HEK HEP)
1200- 16- 25- A-23
WA5HEP (WA5s HEK HEP)
168- 3- 3- A-21

CANADIAN DIVISION

Maritime

WA4MFS/VO1
72,036- 92-261-AC-64
K3ICK/VO1
13,824- 48- 96- C-25
VE1QV.....2261- 17- 47- B-19

Quebec

VE2ANK...13,326- 83-174- A-65
VE2WA....26,928- 66-136- B- -
VE2AMW..21,840- 52-140- A-17
VE2BV....21,150- 47-157- B-19

Ontario

VE2UX/3.113,724-117-324- C-50
VE3PV.....40,590- 82-165- A- -
E3VES.....11,776- 46- 85- B-16
VE3DYB....1914- 22- 29- A- -
VE3BJZ.....1254- 19- 22- A- 3

Saskatchewan

VE5GF.....2925- 25- 39- B-18

Alberta

VE6TP..... 8901- 43- 69- C-10
VE6AAV.....7938- 42- 63- C-33

British Columbia

VE7BHW.....75- 5- 5- A- 2

AFRICA

Morocco

CN8AW.....6996-11- 212- A-28

Angola

CR6DU.....270- 6- 15- A- -

Northern Rhodesia

VQ2WR....17,072-22- 265- A-13

Tanganyika

5H3JR.....50,934-26- 655- A-23

Uganda

5X5JG.....3516-12- 98- A- 5

Somali Republic

606BW.....92,394-29-1062- C-26
601WF.....7920-10- 264- C- -

Sierra Leone

9L1HX.....33,615-27- 415- A- -

Republic of the Congo

9Q5AB.....33,120-30- 368- A- -

ASIA

Formosa

BV1USG[6].....666- 6- 37- A-10

Japan

JA1BRK...26,535-29- 305- B- 9
JA1CG....15,713-19- 277- A-26
JA6NP.....9090-15- 202- A-22
JA1BUI.....42- 2- 7- A- -
JA1WA.....6- 1- 2- A- -

Korea

HL9TD.....5632-11- 171- A-18

Lebanon

OD5AX....12,393-17- 243- A- -

Asiatic Russian S.F.S.R.

UAØEH.....5390- 14-129- B- -

Hong Kong

VS6FF.....3- 1- 1- A- 3

(Continued on page 170)

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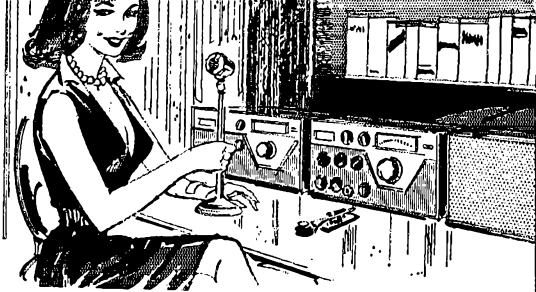

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32V3	239
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DRAKE 2B	207
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SX62A	279
SX99	84
SX100	179
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HT37	299
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HQ100A	129
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RME 4350A	119
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HR10	69
MT1 XMTR	47
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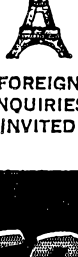

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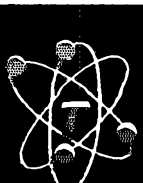

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4X4HW ....1211- 7- 59- B- –

EUROPE

Portugal

CT1KH.....165- 5- 11- A- 2

Germany

DL1KB...140,940-15-1044- B-35
DJ6QT.....45,372-38- 398- A- –
DL4EA....39,432-31- 424- B- –
DL5AO....26,163-19- 459- B-14
DJ2OV....18,480-20- 309- B-20
DL4RT.....9888-16- 206- B-24
DL7AD....5130-18- 95- B- 9
DL3ME.....600-10- 20- B- –
DJ5HN.....288- 6- 16- A- –
DL7DE.....240- 4- 20- B- –
DL4OV (DL4s DT NM XR)
265,318-53-1819- B-66

Spain

EA4GZ.....55,440-20- 924- A- –

France

F7GL.....14,256-12- 396- A-12
F3EG.....8594-12- 239- B- –
F3II.....7695-15- 57- A- –
F8WE.....300- 1- 25- A- –

England

G3CAZ.....6669-19- 117- A-17
G3KFX (G3s JOC KFX)
136,920-40-1143- B-43
G3LDI (G3s IOR LDI MPNY
22,960-28- 274- A- –

Northern Ireland

GI1RY.....462- 7- 22- B- –

Wales

GW3NWV (GW3s DIX NWV)
181,917-51-1489-AB-79

Switzerland

HB9ZY....28,905-47- 205- B- –
HB9MO....26,865-27- 333- B- –
HB9UD.....135- 5- 9- B- 3

Italy

I1RB.....67,858-37- 612- A-36
I1CWN....47,400-20- 793- A-32
I1TBU....15,876-14- 378- A- –
I1LCF.....6060-20- 101- A- –
I1BBZ.....4425-15- 99- A- –
I1BAF (I1s BAF ZEG)
60,120-40- 501- B-30

Norway

LA5HE.....1680-10- 56- A- –
LA6U.....144- 4- 12- A- –

Finland

OH5TM.....1331-11- 41- A- –

Czechoslovakia

OK1MP.....1593- 9- 59- B- –
OK1ADM.....450- 5- 30- A- –

Belgium

ON4GC.....3150-14- 75- A- 7

Denmark

OZ9SL.....45,936-29- 528- A- –
OZ4RT.....4995-15- 111- A- –
OZ3KE.....282- 6- 16- A- 6
OZ4DX.....18- 4- 4- A- –

Netherlands

PA0HBO...55,149-31- 593- A- –
PA0LOU.....3192-19- 57- A- 4

Sweden

SM5BDQ...26,220-20- 437- B-30
SM5BDS.....2160-12- 60- B- –
SM5BPJ.....480- 8- 20- B- –
SM6BJI (SM6s AOE BJI BSK)
44,914-34- 441- B-24

Poland

SP5AR.....9785-19- 177- C-26
SP6FZ.....36- 3- 4- B- 1

European Russian S. F. S. R.

UA1KBW (3 oprs.)
2480-10- 85- B- –

Ukraine

UB5FG.....956- 8- 39- A- –

Rumania

YO4WU.....378- 6- 21- A- –

Malta

ZB1BX.....336- 7- 16- A- 9

I.T.U., Geneva

4U1ITU (5 oprs.)
49,916-26- 645-BC-31

San Marino

9A1AIJ (1Bs A1J LCK Z5Q)
118,674-38-1041- A-53

NORTH AMERICA

Cuba

CO8RA....36,851-43- 288- A-30

Dominican Republic

HI8XRM....9292-23- 135- A- 9

Panama

HP1JC.....3591-19- 63-AB- 9

Puerto Rico

KP4AOO..343,557-59-1911- A-59
KP4AXM (6 oprs.)
297,131-61-1637- B-96

Canal Zone

KZ5DG....92,304-48- 644-AC-25
KZ5FC (5 oprs.)
18,620-35- 178-AC-11

Guatemala

TG9SC....304,854-62-1639- C-30

Costa Rica

TI2EW....209,040-65-1080- B-30
TI2JR.....168- 4- 11- A- 3

Bahamas

VP7CC....253,332-62-1362- A-48
VP7BG.....2505-15- 56- A- 1

Bermudas

VP9BY....35,719-23- 518- A- –

Mexico

XE1FFU...16,725-25- 223- A-12
XE0CS (K6s ICS JJC)
14,586-31- 143- B-15

Nicaragua

YN1LH....33,600-28- 400- C-10

Jamaica

6YAAH.....6370-13- 164- A-17

OCEANIA

Eastern Carolines

KC6BK.....1617-19- 81- A- –

Guam

K9CVJ/KG6..2448-12- 69- C-11

Marshalls

KX6BU...104,370-49- 710- C-22

Australia

VK3ATN..103,785-51- 679- A-35
VK3TL....20,375-25- 273- A- –
VK2AHT....8883-21- 141- A- 4
VK3QV.....759-11- 23- A- 5
VK2JZ.....306- 6- 17- A- –

Cook Islands

ZK1AR.....36- 3- 4- A- 1

New Zealand

ZL1AGO...15,402-34- 151- A-12

SOUTH AMERICA

Chile

CE1AD.....1938-17- 38- B- –

Colombia

HK4EB...222,525-69-1070- B-38

Peru

OA4PD...109,560-41- 830- B-33

(Continued on page 172)

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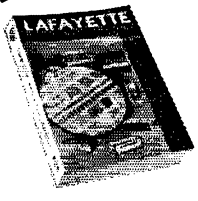

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OA1W	9436-28-	113-	A-15				
Netherlands Antilles				*British Guiana*			
PJ3CD	59,592-26-	765-	A-25	VP3HAG	180,420-62-	971-	A-31
PJ2CU	9576-24-	133-	A-15	*Venezuela*			
Brazil				YV5BIG	381,150-77-1650-		B-64
PY2BGO	11,316-23-	164-	C-12	YV5AGD	366,252-92-1327-		BC-60
PY5EG	2976-12-	86-	A- -	YV5BPG	54,560-44-	417-	B- -
PY2CQ	150- 5-	10-	B- 1	YV1DP	9702-22-	147-	B- 6
PY2SO	36- 3-	4-	B- 1	YV5AHG (4 oprs.)	840,960-80-3549-		AB- -

[1] KØDQI, opr. [2] W2VCZ, opr. [3] W7WJB, opr. [4] W9WNV, opr. [5] K5ABV, opr. [6] WA5FCZ, opr. [7] WA6HRS, opr.

ARRL thanks the following amateurs for submitting check logs C.W.—K1s ETS SWG, W1s RWU TVN, W2s HEG MNW, W4s FRO JUK, W7QB WA8HDP VE1AE VE4JT VE6MC VE8WN F2SQ LZ1KRF OK1s AMS US, OZ7X SMs 4AWC 5CAK 5MX 7ASN 7EH, SPs 5ZA 8ARY 9PT; *Phone*—K1ETS W1FDL WB2JUC W4s DRK GQL, W6s JZG ZMX/6, W8s CHX FTQ, K9VSY W9s EPH MG, VE2SI VE3DGX VE4DQ K4CSY/KP4 OA4KY OZ5JT PAØJWA PY1BQK and SM4CMG.

The World Above 50 Mc.

(Continued from page 102)

me in Iowa. The band was open for him to Washington and Oregon but I couldn't hear any skip although the band had been open most of the day to the south and east and west. His s.s.b. was 57; my c.w. was 569. At 0306 WØCUC/VE4 called me. He is from Sioux Falls but is working at Churchill, Manitoba, Canada, about 1300 miles straight north of me. I copied him off the rear of my beam which was toward Iowa. I swung the beam on him and he was running from S8 to 40 db over 9. With the beam pointed north I could still hear WØWKB but he sounded like aurora, he could not copy me. I talked with CUC for an hour during which time he also worked WØQIN and W9HGE, both of these fellows Q5 at my QTH with somewhat of an aurora sound to their s.s.b. I was using a.m. and c.w. but could not raise either WØQIN or W9HGE. CUC said the signals had QSB and some flutter up there. I went outside about 0350 and saw a light green aurora in the northern sky at this time. CUC faded almost out but he could still copy me up there. We signed at 0405 GMT. This was WØCUC's first day on six operating /VE4 and his first QSO was with VP7CX." That's what we like about 50 Mc. — the unexpected!

144 Mc. and Up

Starting with the "Up" portion of this column we've found 3 reports concerning the 1215-Mc. band. K4CLE tells us that he's working on a 6½' dish for the band and also a 7768 preamp. Doug sez the 6299 has proven itself very reliable for 432 Mc. so he feels that the 7768 in a nigh gain cavity circuit will prove to be very valuable until a paramp can be constructed. He also mentions that 432 has been normal with good contacts on all skeds.

WB6DMB of Lawndale has noted excellent conditions on 1215 Mc. on June 21 and reports that repeated observations seem to point to the fact that this band is adversely affected by a high moisture content in the air, such as rain or ground fog. Bob

(Continued on page 174)

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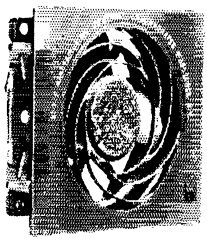

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is also continuing his experiment on 10 kmc. and is working on a crystal-controlled converter for 432 Mc.

In Bellevue, Washington, WA7ALL/WA6HIA sends us the following report of activity in that area with APX-6 tests on 1218 and 1240 Mc. "July 31 — W7AGJ, portable on Mount Walker worked K7GIJ in Seattle (33 miles) and WA7ALL in Bellevue (38 miles) with 59 + signals. He also worked K7SMN/7 near Bellevue (38 miles with 55 signals. August 1 — W7AGJ portable on Mount Erie worked WA7ALL on Cougar Mountain (68 miles) with 59 signals in a heavy rain storm. Aug. 2 — W7AGJ portable on Mount Constitution worked WA7ALL portable on Cougar Mountain (84.5 miles) with 59 + signals. The APX-6's were converted more or less according to 'QST' and the antennas were as follows: W7AGJ, a very tiny corner reflector; K7GIJ, a 30-element yagi at 30'; K7SMN, a 90° corner reflector; WA7ALL, a dipole-fed 4' dish mounted on top a Volkswagen." Thanks for such a complete report, Don. Hope you let us in on the rest of your work on this band and others.

At Whitman, Massachusetts, K1VUT is building a transceiver for 420 Mc. and is interested in finding someone to keep skeds with him. WB2JCP sez that having experimented with a converted and borrowed Vocaline 460-Mc. transceiver and using a ¼-wave whip he's about decided that he could get further on 432 with more than ¾ watts.

For those of you trying to get Pennsylvania on 432-Mc. the following is sked kept by W3RUE, Pittsburgh: Transmit c.w. 10 minutes at 8:30 P.M., EST, northwest toward Detroit and Toledo then listen 10 minutes — 9:00 P.M. 'till 9:10 EST toward Massachusetts, Connecticut, etc., then listen 10 minutes. 9:30 'til 9:40 P.M. south toward Winston-Salem, Salisbury (North Carolina), Greenville, South Carolina, then listen 10 minutes. 10:30 P.M. EST 'til 10:40 toward Kentucky and Tennessee, then listen 10 minutes. Frequency is 432.010 kc. and Ted recently worked Maryland for state #7 on 432 Mc.

WA4FIJ is finishing up the oscillator and working on a new converter for 432. News from California on the higher frequencies is good. K6JC writes that several more stations are now on s.s.b. on this band in the San Francisco Bay area and others are building. K6HCP and W6FZA are now doing an outstanding job on s.s.b. with signals better than two meters over their 200 mile path. Alan W6FZA is working WA6QQ and K6JC regularly on c.w. and W6VSV on a.m. K6JC has just built a modified J slot and worked Alan with the antenna just 12' off the ground with 60 watts, thanks to the balun built by W6VSV. W6AJF is building all kinds of test equipment such as mili watt meters, s.w.r. meters, etc., and is frequently getting together with W6FZA on c.w. over the longest path from the Bay area to Porterville.

WA6LRD in San Jose is doing an outstanding job with a Gooney Bird and one varactor. Two watts output and he works everything he hears, including

(Continued on page 176)

Uncle George Says . . .

Visit the Nation's Capital on your way!

The capital of the United States, one of the most beautiful and impressive of the world's centers of government—offers the final bit of spice to make your trip to the World's Fair complete. Plan to include a visit to Washington, D. C. in your itinerary. **(Don't miss the big Hallicrafters display at Uncle George's in suburban Wheaton, Md.!)** You'll be delighted by Washington's fascinating embassies **(be sure to visit Ham Headquarters . . . Uncle George's in Wheaton, where else?)** . . . see the white tiger at the zoo, the flood lit Capitol at night. Better yet—just stop at Uncle George's and we'll tell you where to go and what to see. **(You can be sure we'll say a few kind words about our Hallicrafters display!)**

Uncle George's Ham Shack

11324 Fern St.
Wheaton, Maryland
949-2262

NOW IN OUR TENTH YEAR OF SERVICE TO HAMS

W6AJF about 65 miles to the north. K6SDZ is on 432 c.w. with considerable power and will probably do big things when he gets fully rigged. K6LEW in Sacramento is coming through to the S.F. area with his high-power s.s.b., and WB6FSC is about ready to come on s.s.b. from Palo Alto. The old time regulars, W6VSV, W6PBC, W6EDC, W6DFU, W6AJF, W6OSA, W6AUZ, WA6BAN, W6OHQ are all going strong. WA6YYM writes to tell us that he should be on 432 by the time this is in print. W6IEY sez that he has completed a transistorized 432-Mc. preamp and also ran some experiments in converting a surplus ANTRC-8 corner reflector from 240 Mc. to 432 Mc.

From WA6HTJ we hear "I don't believe that we here in southern California can claim any real records on ATV (440 Mc.) but the longest distance around here so far is W6LYS to W6VCF, 40 miles with a snow-free picture". Also, W6LYs to W6DYB, slightly less than 40 miles, snow free. W6LYS runs 120 watts output to a 32 element colinear. Also — for a low-power record, WA6HTJ to W6LYS, 35 miles, with 400 milliwatts output. Some snow, but large letters readable. Antenna at WA6HTJ is a 64-element colinear at 70'. All above contacts were two-way. Also active on 435 TV in this area (L.A.) are W6IWA, WA6LYL, WA6IRB/6, W6MMU, W6EUZ and others. We meet on Wednesdays at 2100/2200 local time on 146.6/435.6 Mc. (now that's really getting the frequency exact.) I am in the process of constructing a kw. rig for TV and when finished will be trying for W6HPH (100 miles) as well as San Diego (120 miles)." Sounds like California has much more TV activity than most of us realized. Go to it boys, and be sure to let us know future results.

K7ICW reports that his new QRO tank circuit is completed and the 220-Mc. antenna installation is stalled. In Michigan W8PT tells of a good inversion on the night of July 5 when he worked WØIDY on 432.012 Mc. (275 miles) with S9 signals. Best opening of the year so far, sez Jack. "New antennas now up for 432 (4–15 element yagis at 75'), 220 (13 element yagi at 70'), and old (20 over 20 yagis) beam about to go up at 64' for 114 Mc.," sez W8PT. He also tells us that WØCTM is now active on 432 on Tuesdays and Thursdays from Minneapolis and has been worked by several of the 9-land boys. At Ann Arbor, K8TLO tells us that conditions were good on 432 Mc. most of July, when W9ZIH was copied any time he got on the air. W8YIO heard WØIDY but no contact. K8TLO sez he's just completed his 64-element colinear and will report soon on performance. K8ZES, of Galion, Ohio, kept skeds with W8FAK at Lebanon on 432 for several weeks. Only once were the signals not heard (115 miles). W8FAK runs about 50 watts input and Sid about 35 watts. Skeds with W8DQU (70 miles) have been fruitless except that several times Sid was heard although he never did hear Pat. Future equipment planned at K8ZES is a 4X250 final amplifier for 432 Mc.

W8DOY is another of the boys looking for skeds. His present equipment consists of a crystal con-

(*Continued on page 178*)

trolled home brew transmitter operating on 432.54 Mc. with a 4X150A in a cavity for the final amplifier, running about 15 watts output. Receiver is a 416B converter into an NC 173. Beam is 5 elements. Tony is located in Niles, Ohio, so those of you interested get in touch with him. QST

Happenings of the Month

(*Continued from page 79*)

Directors on a proposal to change the date of the 1965 meeting to May 21.

On motion of Mr. Denniston, unanimously VOTED that the League cast its ballots in favor of IARU proposals 108 and 109, relating to the admission into membership of the Amateur Radio Society of Barbados and the China Radio Association.

On motion of Mr. Chaffee, after discussion, unanimously VOTED that, with reference to the Board action on May 1, 1964, and on recommendation of the Finance Committee, in settlement of retirement agreements with former General Manager Arthur L. Budlong, the General Manager is directed to purchase from the surplus funds of the League an appropriate annuity policy to provide retirement benefits in accordance with the terms submitted by the Connecticut General Life Insurance Company by letter dated April 27, 1964.

On motion of Mr. Denniston, unanimously VOTED that the League sends its very best wishes to George S. Turner, W3AP, on the occasion of his retirement from the post of Chief of the Field Engineering Bureau of the Federal Communications Commission and expresses sincere appreciation for the warm relationships which have existed for many years between the amateur service and the Bureau under his jurisdiction.

(In the course of its meeting the committee discussed, without formal action, the commemorative stamp, W1AW modernization, license fees, RM-499, amateur tower cases, K2US, the anniversary essay contest, DXCC, the Maxim medal, and business matters.)

There being no further business, the Committee adjourned at 2:50 P.M.

JOHN HUNTOON, *Secretary*

Fine Points in Message Handling

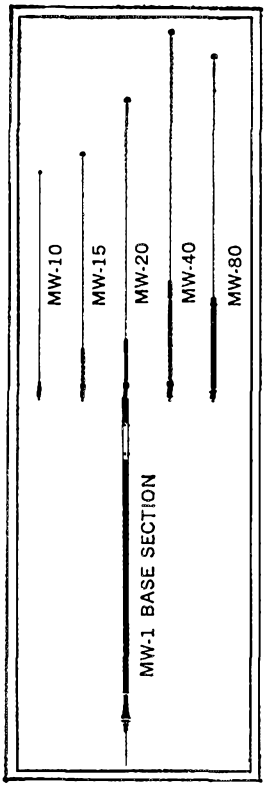
(*Continued from page 90*)

when a c.w. operator says "SIG" before he sends the signature: (1) A message signed "Jones" which should have been "Ned Jones." (2) A message signed "Boy" which should have been "Nature Boy." (3) A message signed "Sigal" which should have been "Al." (4) A message signed "$\overline{\text{AR}}$" because the transmitting station sent "SIG NED AR." The separation sign $\overline{\text{BT}}$ tells the receiving operator that the signature is coming; that's enough. In the signature, as in the address, it is proper to separate parts of any address given with the sign AR.

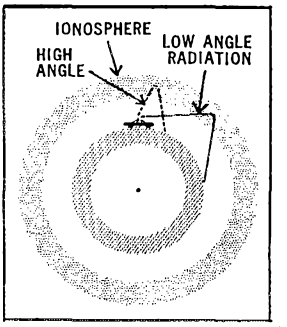
* * * *

These are just a few of the things you run into when you are transmitting the various parts of the message. There a great many more "tricks of the trade" which we'll let you in on some other time.

Meanwhile, remember: you are a much worse lid if you copy wrong than if you copy slowly. QST



Monowhip SLEEVE MONOPOLE MOBILE ANTENNAS *for amateur radio with interchangeable top sections for 10 thru 80 meters*



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MW Series consists of single base section and choice of separate, easily-inserted top whips for 10, 15, 20, 40 and 80 meters.

See your B&K/MARK Distributor or Write for Catalog HW21-Q

Unique design provides highly-efficient, versatile, single-band or multi-band operation—makes it easy to "add-a-band." Feedpoint elevated above ground plane of vehicle lowers angle of radiation, increases effective range of both skip and ground wave communications. Omnidirectional radiation characteristic helps overcome usual pattern distortion caused by vehicle. 52-ohm impedance match across extremely wide bandwidth provides exceptionally low VSWR—and utmost radiation efficiency. Rated to handle 500 watts PEP input on all bands, conservatively. Extra rugged to withstand severe environmental conditions.

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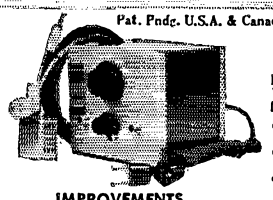
A PRESELECTOR SECOND TO NONE AND A T-R SWITCH BEYOND COMPARISON



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MODEL 102A
$69.45 (Add $7 for Sidetone)
15 DAY TRIAL

Return For Full Refund If You Burn It Out Or Are Not *FULLY PLEASED*

- Std. coax coupler (xmtr to feedline)
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The DX COMPASS computes great circle bearings and distances from your QTH to any latitude-longitude. Simply mark latitudes on 6" vinyl plastic discs, rotate to solution, read both forward and return bearings. Helps track Oscar. Not a slide rule
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Very high prices paid. Freight prepaid. AN/GRC; PRC; APR; APN; ARC; ALT; URM; UPM; TS- We also buy all military and commercial test, radar, and communication equipment.
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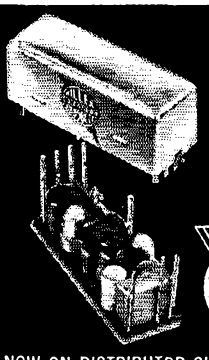

Pre-tuned / pre-packaged IF strip

Model 8902 pre-tuned 455 KC IF strip provides excellent gain (55 db) and selectivity (6 db bandwith: 8 KC), No alignment is required. Included among the 21 components on the PC board are a mechanical filter, 2 transistor amplifiers and a diode detector capable of driving earphones. Overall dimensions: ½" x ½" x 1½".

Model 8901 input IF transformer adapts the IF strip for use with a converter in capacity detectors, AM and CB receivers. Both units are included for $5.75 net.

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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 advertisment 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 noncommercial 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.

MICHIGAN STATE Convention, Grand Rapids, 17th Annual, ARRL Sanction, October 17, 1964, Pantlind Hotel, Michigan's Best. Inquire Post Office Box 1333.

10th ANNUAL VHF Roundup will be held Saturday, October 10th, at Three Rivers Inn, Liverpool, New York. Speakers, dinner, floor show, all for $6.00 advance registration: $6.50 at the door. Tickets, Dick Holbert, 1607 Stolp Avenue, Syracuse, N.Y. 13207.

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 or ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. 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.

SELL, swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

COLLINS Equipment bought, sold & repaired. Paul A. Reveal, 129 Midland Ave., Glen Ridge, N.J.

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.

COLLINS 32V-2 drives this 600 watt AM rig. Rack-mounted on casters includes final, modulator, power supplies, modulation 'scope, RF switching section. Run final on CW, AM, Linear. $350.00. W1HRO, 27 Birchwood Rd., Springdale, Conn.

ENTERING College this Fall. Must sell entire rig to pay for college. No reasonable offer will be turned down, but on first-come first served basis! SR-150 with AC power supply, HA-1 keyer with key, Knight SWR Bridge, AR-22 Toro, Bud low-pass TA-33JR. B&W antenna switch. WA8ASV, 1121 Milbourne, Flint, Michigan.

TRANSISTOR Characteristic Curve Plotter, manufactured by Dunn Engineering, Mod. 331 w/schematic and manual. 26 tubes. VC sweep adj. 0-50v. 1 in steps 1 microamp/steps to 1 ma/step. Original cost, $800. F.o.b. $200. In perf. condx. Peter von Raits, 1145 Jerico Tpke., Woodbury, L.I., N.Y. MY 2-5090.

SELL: SX-88. $275.00. WAØAWL.

QSLS?? WPES?? Personalized made-to-order one-day service!! Largest variety samples 25¢. Deluxe, #5¢. (refunded). Sakkers, W8DED, Box 218, Holland, Michigan (Religious QSL samples 25¢).

QSLS. Christmas Designs. Cataloque. Samples 10¢. Longbrook, Box 93-W, Quakertown, N.J.

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.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

C. FRITZ, bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press. 6707 Beck Ave., North Hollywood, Calif.

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

DELUXE QLS. Petty, W2HAZ, Box 27, Trenton, N.J. Samples, 10¢.

CREATIVE QSL Cards. Free, new catalog and samples. Personal attention given. Wilkins Creative Printing, P.O. Box 787-1, Atascadero, Calif. 93422.

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. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK, 1996 N. M-18, Gladwin, Mich.

QSLS, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

ZIP Code rubber stamp, call, name, address with ink pad, $1.00. K4ISA, E. Perry, Box 8080, Allendale, Fla.

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, 100 for $3.00. 28 new drawings. Samples 10¢. Brigham, Colson St., No. Billerica, Mass.

SUPERIOR QSLs, samples 10¢. Ham Specialties, 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. Sample 15¢. Agents 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.

1¼" Call QSLS $2.40/100. $2.90 (2 sides). Samples. Garicpy, 2624 Kromer, Ft. Wayne, Ind.

QSLS: Quality with Service. Samples Free. R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

QSL Specialists. Distinctive samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Ill. 60639.

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.

ELEGANTE QST. "A luxury to Send; an Honor to Receive". Sample, 25¢. Crafted by Samco, Box 203-T, Wynantskill, N.Y. 12198.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to YARSCO, Box 307, Yorktown Heights 1, N.Y.

QSLS. Gorgeous Rainbows! Top quality! Fast service! Low prices! Samples, 10¢, refundable. Joe Harms, WA4FJE, 905 Fernald, Edgewater, Fla.

HUNDRED QSLS. $1.00. Samples. dime. Meininger, Jesup, Iowa.

CUSTOMIZED QSLS with your autographed photo. Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland 21207.

QSLS. Large selection including photos, Rainbows, cuts, etc. Fast service. Samples dime. Ray, K7HLR, Box 1176, Twin Falls, Idaho.

QSLS, SWLS. 3-colors, 100 $2.00 samples dime. Bob Garra, Lehighton, Penna.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSLS. Design your own from our many styles. $1.50 per 100 up. Samples 10¢. K. Kidd's, RD 1, Box 254, Telford, Penna.

QUALITY QSLS, custom and stock. Samples 10¢, 25¢, 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

QSLS $2.00 per 100 postpaid. New style glossy 2-colors. Free sample. Hobby Print Shop, Umatilla, Fla. 32784

QSLS. Samples free. Blanton's, Box 7064, Akron, Ohio 44306.

QSLS, $1.75/100. Samples 5¢. Nu-Print, 322 Page Blvd., Springfield, Mass.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS. Free samples. New designs. Dave's Printing Service, Box 578, Broaddus Branch, Philippi, W.Va. 26417.

W6OHE Press, quality QSLS. Samples 10¢. P.O. Box 2411, San Bernardino, Calif.

RUBBER Stamps, 3-line. $1.00. Andrew Travis, 2002 West 8th, Austin, Texas 78703.

RUBBER Stamps $1.00. Call and address. Clint's Radio W2-UDO, 32 Cumberland Ave., Verona, N.J.

1965 Desk Calendars, your name, call, address, 3-$1.00. H. Morgan Printery, 443 Euclid, Akron, Ohio.

QSLS. Stamp and Call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS. $1.90. dime. Filmcrafters. Box 304, Martins Ferry, Ohio.

PRINTING For the radio amateur. Catalog 10¢ Free. L & M Press, 1813 Madison Ave., Austin, Texas.

CANADIANS: Invader 2000, Valiant, HRO Sr., DB23, R390 rcvr, Tapetone rcvr and converters: BC375E, ART-13, oscilloscope, G4ZU antenna. More! Send for list. Want: Dumont 'scope 275; GR Bridge 916, 1606A or similar. VE3BVX, 11 Sussex N., Lindsay, Ont., Canada.

CANADIANS! Trade Bausch & Lomb microscope, new, 10 and 43X power. Cost $125.00 for anything in ham gear. VE3GG.

CANADIANS! For sale: Johnson Valiant, factory-wired, in excint condx. $315.00. VE5RX, Box 472, Yorkton, Sask, Canada.

CANADIANS! For sale: NC-300, $250.00; DX-40 with VF-1 attached, shielding, PTT added, $80; S-107, $50. Paul Cragg, VE3AXT, 230 Geraldine Ave., Peterborough, Ont., Can.

CANADIAN KW-4-400 final, 805s mod. Hammond cabinet and transformers, $225. Valiant, $295. SX-101A, $385.00. QSTs 1920-1964, also incomplete set 1920 to 1958. P.O. Box 154, Oakville, Ont., Cana.

WANTED: AA coil set and dial scale (10 meter bandspread) for HRO-60. D. Palmer, W6PHF, 638 Benvenue, Los Altos, Calif.

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.

FOR Rent: January thru April 1965. Hamshack, tower, TH-4 beam ant, attached to 2 bedroom 2-bath home, beautifully furnished. Completely equipped in quiet neighborhood. Convenient shopping, golf, beach. 1212 Park Road, Hollywood, Fla.

WANT: R-391/URR receivers, parts, assemblies. Nick Thompson, 99 Water, Millinocket, Me.

APACHE, $165; HQ-110, $130. Local sale. WA2HYT, 1340 Raleigh Rd., Mamaroneck, N.Y.

CLEARANCE: Dumont 4 Beam 'scope, $99; SWR Bridge 250-350 Mcs., new, $40; Chart Recorder, $35; computer-metals, $75. Sorenson reg. 8 & 15 amps, $79. Hickok 100 microamps, new, $3.50, many others. Trades. Milton Meinwald, 2043 E. 52nd St., Brooklyn, N.Y.

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. Harry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

WANTED: Parts, sets, as is GRC-9, BC-610, GRC-27, Autodyne. 236 Park Avenue, Bethpage, L.I., N.Y.

HAM Discount House. Write us for lowest prices on Ham Equipment. Factory sealed cartons. Specify equipment wanted. NC-300 w/matching spkr, $150; Valiant, $150; Valiant FW, $195; Apache; $150; TR-44, sealed carton, $50; HT-44, $316; SR-150, $520; HT-45 with PS, $395. F.o.b. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

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., 131 Lawrence St., Brooklyn 1, N.Y. 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.

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 your 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 Kishwaukee St., Rockford, Illinois.

FOR Sale: W6BWK estate: Clegg Zeus 33I, $495.00; Clegg Interceptor and power supply, $295.00; Lettine 262 and U.F.O. supply, $150.00; RMF converter 56-220Mcs. $175.00; Hallicrafters SX-101A, $300.00. Collins 75A2, $225; Johnson Kilowatt desk, Ranger exciter, kilowatt Matchbox with SWR, condx as new, $1000. Many other items. Ted Brix, 5573 No. Van Ness Blvd., Fresno 5, Calif.

COLLINS 351D-movile mount, 516E-1, 12VDC power supply, MM-2 mobile boom mike with earphone, 136B-2 noise blanker, Webster band-spanner antenna and car mount, all in excint condx, cost $590. Sell for $350, with instructions. Adam Gamon, M.D. K8ACF, 2004 Court, Saginaw, Mich.

ATTENTIION 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.

INTERESTED Florida for DX and TVI free hamming? Three bedroom two-bath home on oversized corner lot, landscaped, extra carport for boat, forty feet E-Z Way tower with 5-element Tel-Rex Triband beam. Small equity, twelve miles from Tampa. Complete S/Line with 30L-1, if wanted. WA4QPR, Wolford, Box 823, Brandon, Fla.

GR-91, $29 or best offer. WA9ING, 1361 W. Mound, Decatur, Ill.

COLLINS 32S-1, 75S-3, 516F-2, 312B-4, 4-element 3-band Hornet, Ham-M/Control, 50 ft. Rohn tower; Shure 440SL mike, all in excint condx. Will sell this little-used station for $1300. KL7DGZ/7, R. G. Paige, 4615 Shoreline Drive, Salem, Oregon.

W6OHE Press Quality QSLs. Samples 10¢. P.O. Box 2411, San Bernardino, Calif.

COLLINS gear, immaculate: 75S-3, $450; 312B-4, $115; 32S-1, $400; 516F-2, $65; 30S-1, $975 and RF distortion indicator P & H DI-1, $65; package deal for $1,950. Want 51S-1. W1WNY, John Ashton, 25 Bayberry, New Canaan, Conn. Tel. 203-966-1346.

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.

EXPERIMENTER'S Circuits. 25¢. Wizpatronics, Candia, N.H.

SELL Or Swap: IBM Executive Typewriter, with or without IBM contract, like brand new (cost $700). G. Dubbs, 741 Campus St., Uniondale, New York 11553.

DXER Beware: A real bomb. York 5000 transmitter, 1 kw, using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep, 6 ft. high. Further details, Bill Brown, WØSYK, 28 Marine Lane, Hazelwood, Mo. Tel: HEmpstead 2-6840.

HALLICRAFTERS Equipment in mint condx. SX-101A, $220 and HT-37, $275. Or both pieces $425. Bob Bevington, K5BFQ, Blytheville, Arkansas.

SELL: WRL Meteor, Eico 722 VFO. Going Transceive. WA2-ZVJ, 2115 East 27 Street, Brooklyn, N.Y.

SELL: F/W Valiant II, SX-100, D-104 mike and stand, guaranteed like new condx. First check for $450.00 takes all. WA4LDI, Box 248, Winnsboro, S.C.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

COLLINS 51J4 or 51J3 wanted. State condition, price. Phone collect P to P. Mike Ercolino, W2BDS, 201-775-7252.

FINE QST run, 1923 through 1950 complete; 1922 January only missing. Gud condx. Have other odd issues, other years. From W1NFH's estate. Mrs. Nellie Wentworth, Brattle St., So. Berwick, Maine, 3908.

FOR Sale: Heath Apache, Johnson 275 W (SWR) Matchbox, Pierson KE-93A mobile receiver, best offer. Bob Aberle, W2-QPP, 33 Falcon Drive, Hauppauge, L.I., N.Y. 11788.

NATIONAL NCX-3, $275; DC supply, $85. Original cartons, like new. WA2BKT.

SALE: Collins 30S1 linear, new tube and spare, $900. You pick up. Sry, no shipping. Hy-Gain 2-el. 40 meter beam, $60. Johnson SWR bridge and meter, $20. Call Phil, K6ROR. Tel: 714-724-0098.

FOR Sale: Relays, sealed DPDT, 325 ohm coils, $0.50 each. Sealed DPDT 5000 ohm coil plate type, $1.50 each, sealed 4PDT 26 volts, $1.00 each. Sealed mercury wetted contacts W.E. 3800 ohm coil, octal base, $2.00 each. Treadwell, K4-DKJ, 3289 Hallwood Circle, Macon, Ga.

R.F. Coaxial cable, extremely low-loss air dielectric cable. .5 db at 144, .6 db at 220, .9 db at 440, Mc. per 100 ft. For additional info: John Link, 543 Jupiter Road, Indian River City, Fla. AM 7-2372.

WANTED: Navy model TED (not TDE)) UHF transmitters. Cash or trade? W6YY, Mt. Wilson, Calif.

600L, $225; 20A/458 VFO, $175; Mohawk rcvr, $250; Ameco CN144/PS, $30. Vy gud condx. W2ZZG, 19 Abeling St., Canajoharie, N.Y.

SX-101 MK3, scratchless, $175.00; Globe 755A VFO, scratchless, $39.00; Eico 720 xmtr, $49.00; Heath UT-1 pwr. supply, $19; "Bug", $5.00; 100 watt dynamotor, $10; Heath balun coils, $5.00. Call after 6 PM to Bill Widmaier, 509 Hedgerow Lane, Apt. M4, Lancaster, Penna.

DX100B, HQ-110C for sale: $125.00 each. $225.00 for both. Will consider trade on good all-band late model transceiver. K1YRL, Gerry Wisler, 1663 Central Ave., Needham, Mass. 02192.

SELL DX-100, HQ-160, SX-110. Make your offer. WB2GDN, CA 6-6283, 252 Westville Ave., W. Caldwell, N.J. 07007.

FOR Sale: Boston Area: Rugged rack mounted 2200 HV KW supply, $49.00; brand new HA-2 Hallicrafters transverter 50-watt linear output, works two using ten meter eqpt. With P-26 power supply, $99.00; Collins 455 Kc. mechanical filter type Y4O unused, $10.00. Precise model 111 mutual conductance tube-tester LN, $24.00. Cushing, W1KSB, 5 Bickford Rd., Malden, Mass.

QSTS 1922 thru 1943 complete. 1923 missing. Best offer. Ship from Massachusetts collect. Irving Groves, W7CF, Hayden Lake, Idaho.

COLLINS 32S-1 xmtr, $380.00; 516F-2 PS, $80.00. KWM-1, 516F-1, $375.00. All like new condx. WA9BKL, 312-323-2486.

CHRISTIAN Ham Fellowship now being organized (non-profit undenominational fellowship organization). Christian Ham Callbook, $1.00 donation. Write Harry Wieskamp, WA8CFH, 96 East 21st St., Holland, Mich.

QSTs for two or six equipment, 1923-1953 complete. Or $100 cash. F.o.b. Franklin Lakes, N.J. L. Hardy, W2QO.

WANTED: Hy-Gain Hy-Tower gud condx. Can trade TR-44 rotator, W8UWJ, 225 Hillcrest Drive, Cincinnati, Ohio. Tel: 513-761-8896.

SALE: College Drake 1000 watt low-pass $10. Waters Com preamp, $18.00; Ameco 6 meter Pre-amplifier, $6.00; 813, $7.50. 1500 volt p/s, $25.00. Many other bargains. Write for list. Prices open to discussion. WA2MHY, 16 Coolidge St., Larchmont, N.Y. 10538.

NC-109 receiver with Ameco 6M converter. Both in excint condx. First $100 takes both. Shipped collect. K3UDB, 109 Woodland Dr., Mechanicsburg, Penna.

APACHE, SB-10. Excint condx. $250.00 or you make offer. W4SVX, 272 West Laila Dr., Melbourne, Fla.

COLLINS KWM-2 and 516F2 AC supply. $850. 301-1. $3.50. All in like-new condx. WA2AVW, Ed Rosen, 229 East 18th, Brooklyn 26, N.Y.

2 Meter 90W 829B transmitter complete, in perfect optg. condx. WB2CNT. Tel: 516-MY2-2997.

ESTATE W3IOI: Viking 500, $500; HQ-170, with spkr. $270.00; TA-33 Sr., $45.00; coax relay, $5.00; Ham-M rotator, $55.00. F.o.b. Rosemont, Penna. Reasonable offers will be considered. K3MCO, Rosemont Plaza, Apt. 116, 1062 Lancaster Ave., Rosemont, Penna. 19010.

WANTED: Sonar transmitters and transducers, especially Model NMC. Swap ham gear, or cash. Ray Newsome, K8TJP, 2670 Pinetree, Trenton, Michigan.

HEATH HW-12, $105.00; Jennings vacuum variable, 400 mmfd, 10K, $35.00; rotary inductor, 1 kw., plus, $10.00; new 4-400A's, $27.50 each; 4 mfd, 5 kv., $5.00 each; H.V. xfrmr, 3600-0-3600 at .6A, 220 VAC pri., $20.00; auto xfrmer 115-220 VAC 2 KW, $10.00. 5 h. .6A choke, $8; fil. xfrmr, two 5VAC at 15A ea. windings, $7.00. All shipping charges prepaid except H.V. xfrmr and Auto xfrmr. Fred Feeley, 120 Boston Ave., Massapequa, L.I., N.Y. Tel: 516-PY-9-6361.

FOR Sale: Plate Transformers 3600-0-3600 VAC @ 1000 Ma. CCS, with 110V and 220 V primaries, $35.00. One Year Guarantee. Peter W. Dahl Co. 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel. 922-7618.

SPECIAL Closeout on demonstrator equipment SB-33, $319; Galaxy III, $299; TR-3, $489; SW-240, $279. Big specials on reconditioned equipment. Collins 75S-3, $449; Galaxy 300, $199; 75A-4, $479; Johnson Invader, $299; HT-37, $249; HX-50, $299; special on AM mobile gear, A6-67 $45; MT-1 Cheyenne, $39; MR-1 Comanche, $39.00; PMR-7, $49; converters, $9. Send for free equipment list. Collins 75A01, $149.00; 75A-2, $199.00; Viking II, $75. All guaranteed. Clegg 99'er, $79.00; KWM-1, $199. Thor with AC/PS modulator, $299; SD-600, $349; SX-100, $129.00. Terms: Cash, trade or terms. Bryan, W5KFT, Edwards Electronics, 4124 34th St., Lubbock, Texas. Phone SW5-2595.

SELL: Knight R100A wid S-mtr and spkr, $85.00; BC348Q wid p/s, $60. Eddystone 898 dial, new, $12.00; 3 used 304TLs, new T200. Write Ken, WB6BOT, 1315 Crumley, W. Covina, Calif.

A HAICO Regulator for that mobile 115V AC generator will protect your expensive tubes and permit 1 Kw input operation in motion. $69.50. Al Goddard, WØZTA, 1560 South Otis St., Denver, Colorado 80226.

DRAKE TR-3, AC-3, DC-3, MS-3, mobile mounting bracket, New-Tronics Hustler, 80 thru 10, complete with mast, spring, resonators, and body mount. Everything in new condition, and less than 6 months' use: $600. K3MHP, Pete Adely, 176 Bergen Ave., Ridgefield Park, N.J.

HEATH HW-12 75 meter transceiver, perfect, $120.00. Ham-M rotator, $80. Hy-Gain TGS-3 Tribander, $65.00. Linear amplifier, 4 811-A's in GG, 1200W PEP, not junk! $150.00. J. O. Johnson, 32 Hadley Lane, Willingboro, N.J.

SWAP, Johnson 250-39 TR switch in excellent condx for Signal Sentry or similar commercial monitor in operating condx. WA2PNT, 7 Millbrook Court, Williamsville, N.Y. 14221.

WANTED: Hallicrafters S-20 (not S-20RD), S-22, and most early models. Howard Hoagland Junior, 639 North Sierra Bonita, Los Angeles, Calif. 90036.

FOR Sale: Complete VHF station. Hallicrafters SX-96 receiver, 50 Mc. Tapetone converter, 144 Mc. Ameco converter with provisions for 220 Mc. and 432 Mc converters all in the same cabinet. Lettine 262 transmitter, Globe 6N2 VFO, low-pass tilter, three (3) Dow Key relays and other accessories. Must see to appreciate! Best offer over $400. WA2BJA, 139-06 233 St., Laurelton 22, N.Y.

MUST Sell, never used: TR-3 Drake transceiver #6744A; MS-3 Drake spkr, Drake AC power supply; Astatic Mod. 10-D mic. w/ptt stand, $500. Charles H. Burch, K4HN, 1361 S.E. 4th St., Deerfield Beach, Fla. 33441. Tel: 399-5063. Area Code 305.

SELL: Heath GR-18 Super-regen rcvr, $20; Eico 723 transmitter, $35; power supply 700/650 volts, 500 Ma. (sry, won't ship), $50; homebrew electronic key with paddle, self-completing, $20. Combination 25W modulator power supply, 350v, 200 Ma., with carbon mic, $30. Tony Casiato, W3BMF, 729 Rosemont Ave., Pacific Grove, Calif. 93950.

NC-300 and speaker, clean, little used, new tubes: $195 F.o.b. W6FBA, 272-37th Ave., San Mateo, Calif.

SELL: Harvey-Wells TBS50-D (80-2 meters), $30; VFO, $10; APS 50 p/s, $15.00 or everything for $45.00. WA1AVF, Rte. 2, Box 143A, Storrs, Conn.

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.

SELL: Collins KWM-2, 516F2 AC supply. Like new condx: $950. A. C. Lovelace, WA4GAH, 112 Circle Dr., Summerville, S.C. Phone 873-8609.

HQ-170C. In mint condx, $250. John C. Cobb, K7HUM, 620 W. 5th Ave., Albany, Oregon.

SELL: Hammarlund HQ-170C, in excint condx, $195.00. Going transceive. WØLKF, 8448 Meadow Lane, Leawood, Kans.

SB10, $50. John Moses, W1BZ, Brewster, Mass.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, $7.00 postpaid. Wenglare, W4VOF, 1517 Rose St., Key West, Fla.

SELL: 20A with QT1 and Deluxe 458 VFO, clean, in gud condx. Manuals included. $165.00. K8MYO, Mancelona, Michigan, 49659.

EIGHT Foot rack containing DX-100, NC-300/cal./spkr., S22R rcvr, in excint condx. Best offer. K2QBV, Joel H. Kornreich, 1340 E. 86th N.Y. Tel: No. CH-14262.

VHF-UHF Custom building converters, transmitters, KW amplifiers. Frontier Electronics Box 323-2, Orr, Minnesota 55771. Everett, WØHPS. Frankie Hoard, WØPYC.

FOR Sale: Complete Gonset Twim Mobile station, $200. G66B receiver, G77 transmitter with modulator and 3-way power supply. WØQXA, 6775 East River Road, NE, Minneapolis, Minn.

TWO Meter Communicator II complete, $115.00; Galaxy III in sealed carton, $300. New. Hallicrafters HT-44 and SX-117, $580.00. 10 hours use. W7HCJ, E. 6904 Sprague, Spokane, Wash.

SELL: R-100/ACCS, Navigator, Knight signal generator, homebrew linear and modulator, 150 W. Write to WA9JLA, Vaughn Davidson, R. 5, Box 142, Valparaiso, Ind.

SELL: Like new Johnson Thunderbolt, $325 F.o.b. Marysville, Wash. Write to W. Faulstich, W7GYO.

GONSET GSB-100, $175.00 plus shipping. Hattaway, 5475-G Kelley, Ft. Knox, Ky.

APACHE, SB-10, and Mohawk works and looks perfect, $400. Robert Pfeifer, K3HID, 423 Waring Ave., State College, Penna.

TRADE Ameco Nuvistor converter CH-50-W, 14-18 Mc., I.F., barely used, for CN-114 W, or will sell for $37.00, or your best offer. John, WA2PBN, 1035 Summit, Westfield, N.J.

SELL: Marauder, $225.00; Warrior, $195.00; both for $395.00. Drake 2B, 2AQ, $200.00; new Ranger II, $285.00; home brew final with Ranger II, $295.00. Less Ranger, $75.00. Antenna tuner, $45.00. Beams, parts, tubes. Sry, cannot ship. You pick up and get bonus. W1HIL, Wakefield, Mass. Phone 617-245-2001.

FOR Sale: 75A-4, 500 CPS 3.1 Kc filters, vernier knob, recently factory realigned, several new tubes. Dr. E. Liebler, Caro, Michigan. Tel: OS-3-3171.

VIKING 6N2 converter, fine condition, $35.00. WA6FZG, 1522 Kelton Ave., Los Angeles 24, California. Tel: 477-6284.

BEAUTIFUL Collins 32S-1, trans, 75S-1 rcvr w/Waters Q-mult., 500 cyc. c.w. filter (just back from Collins plant completely overhauled, cost $115.00), A.C. P/S and spkr, $850.00. Also NC-303 w/ CRY cal. and spkr. Make offer. All equipment perf. and in mint condx. All letters will be answered. Edward Lubowicki, WA2LRO, 46 Middlesex Ave., Menlo Park, N.J.

6 RCA car phones, 450 Mc. (CMU-15), $20.00 each. 1422 New Britain Ave., West Hartford, Conn.

WOW! Geronimo! Bargains. Buy, sell, trade ham equipment through HEED. Subscription: 12 issues, $1.00. Free copy on request. No cards, please. Lupin, WA2NHH, 1225 Hillside, North Bergen, N.J.

FOR Sale: Collins 30FXC transmitter, Hughes Mitchell HM 103A VFO, National CRM modulation 'scope, National HRO rcvr (pre-WWII), RME DB-20 Preselector, BC348Q with AC power supply installed with speaker. You make offer. W8OAR, 3915 Grosvenor, Cleveland, Ohio 44118.

WANTED: VF-1 VFO and Vibroplex bug. Durlin Cox, WA-9IDW, 308 Maple St., North Freedom, Wis. 53951.

CRYSTALS Airmailed: MARS, Kits, CD, Nets, SSB, etc. Custom finished etch stabilized FT-243 .01% any kilocycle, 3500 to 8600 Kc., $1.75 (five or more same or mixed frequencies, $1.50). (Ten or more same frequency $1.25.) 1700 to 20,000 kilocycles, $2.25. Overtones supplied between 10,000 and 20,000 kilocycles. Add 50¢ each for .005%. HC-6/u miniatures above 2000, add 75¢ each. QST kits, FT-243: "DCS-500", "IMP", $9.95 set. "SSB Package" mixer or filter, $11.95 set. Airmailing 10¢/crystal surface, 5¢. Crystals since 1933. C-W Crystals, Box 2065-O, El Monte, California.

SELL: DX-100. Perfect, better than new, maintained by an electronics engineer, $100.00; also Johnson Matchbox, $30.00; both for $125.00. Also Heath HP-20 utility power supply, $20.00. Will ship. Kurt Eisenach, KØHKZ, 11233 Des Moines Way South, Seattle, Washington, 98168. Telephone 206-CH4-1033.

APACHE Transmitter, in excint condx, $165.00. Matching Mohawk receiver, all bands, 160-10M, in mint condx, with matching spkr and xtal calibrator, $165.00. Both wired, aligned by engineer. Call for demonstration. W2HTD, 86 Brock Rd., Red Bank, N.J. 201-671-0131.

MAGNECORD 817 professional three-motor transport and PT6-J electronics, in gud condx, $185.00. Jennings "U", 250 mmfd, vacuum variable, $25.00. K4GYO, 430 Island Beach, Merritt Island, Florida.

WANTED: Early spherical de Forest audion with candelabra base. H transmitter tube. Boonton Q-meter Model 1 60A. W9EWK, 610 Monroe Ave., River Forest, Illinois 60305.

HQ-140X for sale: $140.00. Will consider trade for Viking II or Valiant. Paul Sturpe, 1207 39th NW, Canton, Ohio, 492-3392.

DRAKE 2A, extras xtals, freq. cal.., original carton, manual, perf. condx: $170.00. Freight paid. K8AIA, Box 953, Hamilton, Ohio.

COLLINS AM wired kit, $5.00. State model, KWM-2 2 Kc. independent receive control: $15.00. Kit Kraft, Box 763, Harlan, Ky.

BANDMASTER TBS50D (50 watts) fone/c.w., 80 thru 2 meters with supply, $39.00; 1962 foreign callbook, $1.00. Antique 1918 army xmttr, $15.00, F.o.b. W9WFT, Richard C. Lackner, 2029 Bradley, Chicago.

PHILMORE CR-5 AC shortwave rcvr. Best offer. WA8EXC, 2111 Fleetwood Dr., Detroit 36, Mich.

WANTED: Drake, Hammarlund Receiver. Al Rohssler, 3501 Foster Ave., Brooklyn, N.Y.

WANTED: Johnson K.W. desk type, late model, 2-400As, final. Must be in A-1 condx. Advise lowest price. WA4DYU, Chas. Harris, Rte 1, Auburn, Ky. Tel: PH-LI2-6437.

WØGFO offers you hundreds of reconditioned equipment bargains. Write for free Blue Book List. Samples: Galaxy 300, $229.00; SWan 140, $129.00; AF-67, $59.00; HT-37, $299.00; SX-101, $179.00; Valiant, $199.00; Viking 500, $389.00; NC-125, $79.00; SP-600, $309.00 and many more. Save now. Write to Leo, Box 919, Council Bluffs, Iowa.

PRINTED Circuit boards. Hams, Experimenters. Catalog, 10¢. P/M Electronics, Box 6288, Seattle, Washington 98188.

HALLICRAFTERS SX-117 receiver, HT-44 transmitter with P-150-120 power supply. HA-10 tuner, transceiver cables. All like new, with manuals. In original cartons, guaranteed perfect. Cost over $900. Will sell for $750.00, cash only. Will ship. WB2INO/W4DLH, J. O. Johnson, 32 Hadley Lane, Willingboro, N.J.

HEATH HX-20, $130.00; HP-20 power supply, $20.00; D-104 mic, $10.00; coax ant. relay, $5.00; Knight V-44 VFO, $15.00; Hallicrafters S-95 revr, $35.00. All in like-new condx. W9-DMQ, 259-K Dover Dr., Des Plaines, Illinois.

FOR Sale: New Johnson SWR bridge, $6; Stancor 203A 10m rig, $25; Gonset mod. monitor, new, $6; Turner xtal mike and stand, new, $8.00; Gonset Triband whip, $10; Elmac PMR6A revr, $60; PMR6A AC, $10; PMR6A DC, $15 Gonset 10-m. converter, $10; cushioned headphones, $3; low-pass filter, $3; selsyns, $3.50; altimerter, $3.50; 75M mobile coil, $8; (trade): drummer's cymbals. All prepaid, W9WTY.

WANTED: Heathkit MR-1 Comanche revr, like new condx. E. P. Sadler, 23 El Campo Dr., San Jose, California 95127.

QSTS For last 8 years: $10.00. Also most from 1949 to 1959. Make offer. Richard Giesen, KØGRP, Estelline, S.D.

MODULATION Transformer wanted, 500 watt type, pri. 3800 ohm c/t; sec. 4500 to 7900 ohm imp., 7000 v test. Advise particulars. E. Hanson, 3127 So. 2800 East, Salt Lake City, Utah.

SELL: Like-new Central Electronics 100V trans., $325.00; Hammarlund HQ-170 rec., $180; WRL Globe Scout. Trans. $40. Gonset Communicator III 2 mtr., $170. Astatic D-104 mike. Alan Woolman, 275 Central Park West, New York 24, N.Y. WA2AEO.

EICO 720, $60; Eico 730 modulator, $50, or your best offer. In excint condx, 1 year old. Manuals included; shipping will be paid. Millard Stahle, K1EZA, 8 Flanders Lane, Wakefield, Mass.

FOR Sale: Heathkit DX100-B transmitter, $75.00; Hammarlund HQ-129X revr., $75; CDR antenna rotator model TR-4, $10. All in gud condx. Marland C. Gale, K2VND, 1 Helena Rd., Staten Island, N.Y. 10304. Tel: 212-EL-1-2172.

JOHNSON Pacemaker, $195. Heath HW-12, $110. Waller aircraft xmttr, 813 output, 8 x 10 1/2 x 16. W2CE.

HAMMARLUND SP600JX-17, gud condx, $350 or best offer. Will pack and ship. Don O'Hallaron, 1 3N. Gore, St. Louis 19, Mo.

SELLING For college: HQ145XC in mint condition, with matching speaker, $210. Louis Davidson, 2571 East 27th St., Brooklyn 35, N.Y. Tel: NI 6-5192.

SELL: Viking Valiant II, factory-wired, Hammarlund HQ-170. $450 for both or sell separately. W9OPL, Shrago, 9513 Karlov, Skokie, Ill. Tel: OR 4-5848.

FOR Sale: F/W Valiant, $200. Sry, no shipping. WA2QQE, Wallace Austin, Barryville, N.Y. 12719.

HT32A, $335; HQ17OC, $240; rotor TR-44, $40, Tribander Hornet 750, $35. Can't use in Hamiltonian Apts 84. Middlesex, N.J. WA2DDV, PH 968-0082.

SELL: Complete station HX-50, HQ-18OC, spkr, mike, Johnson low-pass filter. Original cartons, in mint condx: $575.00. Ted Bennett, WA2JXG, 23 Hampton Rd., Lynbrook, N.Y.

FOR Sale: Best offer. CE 10B, like new. 2 Heathkit CB transceivers, cheap and easy transmitter with AC pwr. supp. and VOX 120 watts P.E.P. Ground grid amplifier 4=1625. 275 watts P.E.P. Gaylord Ottun, Sargent, Nebraska.

KWM-2 serial 13459 AC and DC p/ss. Mobile Mount, $1000. One owner. P.O. Box 72, Chenango Bridge, N.Y. WA2FBL.

CIRCUITS From Handbook, QST, CQ, etc. constructed. All work guaranteed. Reasonable. Write for free list. WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

MODEL 14 TD, Synchronous motor, $50; 14 typing reperforator, SASE for details. Baser, 344 South Franck Ave., Louisville, Ky. 40206.

SALE: Galaxy 300 and PSA 300, $250.00. HE45A 6-meter transceiver, $75.00. KØTFT, Hinton, Iowa.

6-S/FR RTTY Frequency Shift Exciter, in gud condx, w/manual, $25.00. Ed Thornton, 229 Saunders Ave., Louisville 6, Ky.

WANTED: 60 ft. crank-up tower. Julius H. Rothlander, 7427 Grant Ave., Pennsauken 8, N.J. WA2TSC.

QSTS 1932 (X March) thru 1939 (X Sept. '35, Feb. '36) and 1941 (X August) thru Sept. 1948. All 185 copies, $36.00 or will swap for Heath Twoer. W1VXJ, Harry W. Bloechle, 71 Flagler Ave., Cheshire, Conn.

B&W 5100 with 51SB SSB-AM-CW transmitter in excint condx, $225.00. Olson, K2EN, 31 Jervis Road, Yonkers 5, N.Y. 914. Tel: YOnkers 3-7187.

COLLINS 32V2, 120 watt 2 meter adaptor, 2 meter converter, 2 new 4-400A's, $325. Robert DuBois, RD #1, West Branch, N.Y.

WANTED: Used or new Raytheon color TV part horiz. output transformer 12E-26639, Model C-21C1-M. W7TAH, 829 A E. 9th St., Medford, Oregon.

DRAKE 2B receiver, xtal cal., all 10M xtals, $165.00. W3PQV, J. Hallowell, Box 116, Fairview Village, Pa., Phone 584-4814.

SELL: Gonset G-76 with factory transistor D.C. and A.C. power. Mobile Mount, mike, recent factory realignment. Like new condx: $395.00. WA6KUM, 1075 E. 8th St., Chico, Calif.

SELL: Modulation transformer 300-watt UTC with driver transformer, $25.00. Boye Hagerty, W3CFD, Honesdale, Penna.

SELL: Heath GR-91, $28.00; Q-Mult., $8.00. Box 314, Adrian, Minn.

FOR Sale: Elmac AF-67, $50. W5SYN, Box 246, Silsbee, Texas.

SELL: 4-866A, $100; 2-805, $2.00; 2-829B, $5.00; 2-813s, $8.00. All w/socks. two 2.5V 10A xfrmr, 1 Monoset, $5.00; 1-404B Shure, $10 (new); 1-727 E-V w/SD, $5; 2-D-22 Amer. 10-, 1 90606 Millen, $2.00; 2 8 mfd. 1000V oil, $1; 2-4 mf. 1500v $1.50. GSB100 and RME 6900 w P.T.T. mike, antenna relay, excint condx, $4.00. All prices each. W6EUF, 2301 Canehill, Long Beach, Calif.

WANTED: Heathkit SB-10. Robert Hoopes, KØKSV, 605 Tremont, Davenport, Iowa.

COLLEGE Bound: Sell HRO-60 serial No. 505 .0050, manual, spkr, 4 coils, $230.00; ART-13 with all pwr. $95.00. Write to Joel Romines, WAØAVH, Rte. 3, Mtn. Grove, Mo.

CASH For Drake DC-3 power supply. W5FTW.

SELL: HT-37, $285; SX-111 $145.00; R-47 spkr, $8.00. MARS SWR, $10. All guaranteed excellent with manuals. WA5DBB, A. C. Williams, 402 S. James, Monahans, Texas. Ph. code 915-W1-3-3948.

MUST Sell: Antenna problem! Complete station 80-6 meters, Viking Challenger 120 watts c.w. 70 watts AM, $95.00; Lafayette HE-80 revr, $75.00; matching VFO, $30. All equipment factory wired and used 20 hours. WA2SJZ, Bob Christie, 88-15 168th St., Jamaica 32, L.I., N.Y.

SELLING Out: Collins 310B-1 xmtr/exctr, TVI suppressed, manual, 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, all bands 10-80, separate bias and screen supplies; 750 modulator; KW power supply components; scopes, and many other top ham units. Write for free list. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck, N.Y. 11362.

B & W 510OB, $150.00; 510OB and 51SB-B, $195.00; 75A2, $200; Johnson low-pass, $8.00. B & W TR-381, $30.00. W5SAR, Box 314, W5SAR, Guthrie, Okla.

SELL: the great RCA AR88 receiver in gud condx, with manual, $150.00. Johnson Matchbox, No. 250-23 with manual, $20.00. Dow-Key TR antenna switch with double male coax fitting, $10.00. F.o.b. Will ship. Harry Paul, W9KSH, Blair, Wis.

THUNDERBOLT. New, $500 with final amplifier tubes. $400 without. Organs & Electronics, Lockport, Ill.

COLLINS KWS-1: 75A-4. Sell: $1100, or will trade, plus cash for COLLINS KWS-1: 75A-4. Sell $1100, or will trade plus cash for Collins S/Line equipment. John Blackman, 431 East Palisade Ave., Englewood, N.J. 201-L07-5525.

COLLINS 32V3 with low-pass filter. Perfect, $250.00. W9IDHT, Dick Karl, 2836 Leland Ave., Chicago, Ill.

DX-100B, grid-block keying, with Dow-Key, kilowatt low-pass filter, $135.00. HQ-160, $175. Both very clean, in FB oprtg. condx, with instruction book. Will ship C.o.d. Gilbert Boen, K4NHR, 43 Brown St., Lexington, Tenn.

SELL: DX-100, perfect, $98; S-85, $59; DX-35, $29.00. B. Nastoff, 320 W. 56th Place, Gary, Indiana.

A-1 Reconditioned equipment: HT-40, $49.00; HQ-100C, $99.00; AF-68, $99.00; Valiant I, $169.00; NCX-3, $249.00; Collins 75A4, $349.00; brand new HT-41 linear amplifiers, $269.00. Many other items. Write for list. Henry Radio, Butler, Mo.

COLLEGE Forces sale. Hornet Tribander, DX-40, HR-10, all accessories. Complete station in gud condx. WB2ETF, Box 294, Smithtown, N.Y.

VHF Equipment for sale. 6 and 2 transmitter, Globe Hibander, 50 watts AM, 60 CW, $80. NC-155 in excint condx, covers 6 thru 80, $125.00. 2 meter converter, $25. HA-5 VFO 2 thru 80, $50.00; 6-element Telrex 6 meter beam, $25.00. Eico 720, $45; 730, $35.00. Call or write Tom Adler, 2 Garden Road, Scarsdale, N.Y. Tel: 914-SC3-3041.

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, California 95822.

COLLEGE! Must sell: HW-12 75m SSB transceiver, w/HP23 p/s, mobile speaker, PTT microphone, 6 months use, in excint condx! $150.00. WA4EPH, Charles Lambert, 102 Emmet House, Station #1, Charlottesville, Virginia.

SELL: Superior Model 79 multimeter, with test leads, case, manual $16. G. Yater, 326 S. Birchwood, Louisville, Ky. 40206.

COLLINS 32S-1, $400. Will ship express collect upon receipt of certified check or money-order. Jack Gage, W5ICT, 211 Camellia, Orange, Texas.

COLLINS 75A4, ser. No. 4132, with Collins 35U1 low-pass filter, like new, $419. Central Electronics 200V, used 25 hours, can't be told from new, $569.00. F.o.b. Minneapolis, Min., WØBDG, Miller, 3845 Kipling.

SIX Meter Bargain. Seneca, in excint condx, with Heath modifications for improved CW and stability installed, thoroughly checked out, $140.00. K9KTL, 3514 N. Riley, Indianapolis, Ind. 46218.

TELREX 32I-MB 3-El. 20 mtr. beam, $100. Used only 8 months. Cost $185.00 new. Hap Davis, 5 Alfred Road, Framingham, Mass.

NC-105 receiver. General coverage: Built-in spkr, very little use. Cost new $119.00. Yours for $79. Trades considered. Also have other equipment. Belvidere, Box 1103, New Britain, Conn.

DX-40, $40: HG-10, $25.00. K1ZHS. 105 Pine Ridge, Waban, Mass. 02168. Tel: 969-6720.

FOR Trade: Brand new Drake TR-3 and DC p/s for late serial number Collins KWS-1. KWS-1 must be immaculate and in exclnt optg. condx. K0GXL, Mark Holland, 6701 Hickman, Des Moines, Iowa. 50322.

SWAN 400, 420 VFO, 117AC supply complete. Will sell for cash or will consider TR-3/KWM-2 in trade. SB1-LA little linear powerhouse for mobile or fixed, cash offer or trade. WØBNF, Box 105, Kearney, Nebraska.

FRXD Typing reperforator-transmitter distributor. In exclnt condx, perfect operation, synchronous motor, 60 wpm, $45.00. Model 19 table, $25.00. W4NZY, 119 North Birchwood Ave., Louisville, Ky. 40206.

WANTED: B&W FC-30 choke, transformer for 1500 volts DC at 600 mils. Don't need center tap. W3CD, 211 Sumner, Newcastle, Penna.

SX-101A and Apache. Both in immaculate, mint condx. All accessories. $425.00. Stu Holzer, WA2MHF, 446 East Shore Road, Great Neck, L.I. N.Y.

HRO-60, ABCDEF, AA AC, xtal calibr., FM adaptor, Selecto-O-Ject, mint condx. Present net over $1200. Sell $300. K2EGI.

WANTED: Receiver, BC 314D or 344. W7ADS, 109 North Grandview Ave., Yakima, Wash.

RTTY Equipment: 14 T.D, $1001 14 reperf., $125.00; 15 printer, $110; terminal unit, $150; all manuals. No junk! No waivers! W. Lindeman, 116 Beverly Court, Michigan City, Ind. W9LNH.

SALE: Hallicrafters SX-71-U, $100; 500 watt linear, CW driver, p/s in desk top rack, $150.00; Knight kit VFO, $10.00; E-V 630 mike, $10.00; 3-el. 20-meter Shortbeam, and AR22 rotor, $30. Take all for $275. Chicago area deal only. George Hanus, W9BZW, 4908 W. Carmen Ave., Chicago, Illinois. 60630.

VIKING II. 122 VFO, new SX-111, speaker, Globe Chief 90A, modulator, xtals, all perf. condx, with manuals. Best offers take. VB2KDB, 351 Howe Ave., Passaic, N.J.

HALLICRAFTERS Best buy yet, HT-37 in exclnt condx, SX-111 companion in gud condx, giving you 144 watts of excellent sideband, $525.00. Looking for KWM-2 with matching p/s at $750 or will trade plus $250. Bob Ansell, 12 Peacock Farm Rd., Lexington 73, Mass. K1WGM.

WARRIOR KW final, $165.00; Mohawk rcvr, $160.00. Both are in exclnt condx. Will ship. First certified check or m.o. WB6ALQ, Dr. Jack McMullin, 5184 Carlingford Ave., Riverside, Calif., Tel: 684-4381.

EICO Equipment sale: 720 xmtr goes for $75 or best offer. 730 modulator goes for $45.00 or best offer. Both are excellent reliable pieces of gear in perfect condx. Will sell as a unit or separately. WA2VQS, 17 Briarcliff Road, Mountain Lakes, N.J.

WANTED For export: ARC-34, ARC-38, ARC-44, ARC-52, ARC-55, ARC-73, ARC-84, ARN-14C, ARN-21C, ARN-59, AN/GRC-1 thru 10, RT-66/GRC thru 70; R-388/URR thru R-392/URR, SP-600-fx, Military test equipment ARM, URM, UPM, USM, SG prefixes, GR, Boonton, ARC, H.P., 17L-4 thru 8, APN-70, 618T. Also new boxed, unused special purpose tubes. Immediate cash. We pay shipping. Slep Electronics, Drawer 178, Ellenton, Florida. Phone 722-1843.

SELL: Collins 51J-3 (R-388/URR), excellent condx, w/vernier knob, manual, $550.00; Hallicrafters SX-28, w/manual, fair, $70.00; Telerex Beams: 10mtr, wide-spaced 3 el., excellent, $45.00; 15mtr widespaced 3 el., good, $55.00; 20mtr Supermini, 2 el., excellent, $45.00; Telrex R-100 medium-duty rotator, fair, $20.00; Properitch rotator, w/transformer, reversing relay, good, $25.00; Gonset 10mtr convertor, $10.00; PE-103 motor/generator, excellent $25.00; 50 foot tower, excellent, 5 ten foot sections, triangular, 6.5 inches, complete w/top-plate, 3 galvanized screw guy-anchors, turnbuckles, guywire clamps, $75.00; All F.O.B., Jackson, N.H., Mack Beal, W1PNR

COMPLETE station plus for best offer over $600; Marauder, NC-300 with calibrator, DX-40, VF-1, Vibroplex key, AR-22 rotor, Rohn 32 ft. tower, 100 ft. RG/8-U, 100 feet RG-58/U, Mosley TA-33 Jr., T-R relay, plus extra tubes, manuals and 4 years of QST. Deliver to within 150 miles rad. W5TQ, 5720 Meadowdale, Metairie, La. 70003.

ZEROLAND Sellout: Apache with mike and antenna, excellent signal reports, $160.00; 5-in. Heath 'scope, $35.00; Little Osker Monitor, $5.00; Desk, $5.00. M. R. Clement, Rte. 10, South St. Paul, Minn. WAØEKS. 455-8924. Will consider delivery, financing.

FOR Sale: 20A and deluxe 458 VFO, $150. Globe LA-1 linear, $75.00. HRO-7 receiver with extra coils for 15 meters, $150.00. Hy-Gain 2-meter 3-element beam $35.00. E. T. Pennington, 1709 Lincoln Drive, Williamsport, Penna. K3HHZ.

SELL: Globe King 400B, $160; Hammarlund HQ-129X, $90; Globe Scout 66, $45.00; Globe 755 VFO, $25.00; Heath AT-1, $13.00, Heath VF-1 VFO, $15.00, Heath OF-1, $5.00. W1KKF, R. Wawrzeniak, 595 Bee St., Meriden, Conn.

HQ-170, Johnson Valiant, Johnson 6N2 and VFO, Astatic GD-104, Ameco converter and power supply CN-144, Eico 723. Best offers. All inquiries answered. WA2UKR, Al Newman, Pine Bush, N.Y.

ATTENTION: Heath V-7A V.T.V.M., $30; QM-1 Q-Meter, $60; 1B-2A impedance bridge, $60. Manuals included. Cash deal only. F.o.b. W1LYQ, C. J. Mozzochi, 26 Cheney Drive, Storrs, Connecticut.

APACHE, SB-10, Mohawk with matching speaker, Heath SWR Bridge: $395.00. Also NCX-3, NCX-A and NCX-D: $495.00. All excellent, with manuals. K5ZSC, Box 190, Pleasanton, Texas 78064.

FIRST Come, first served. HRO-5, $55. Viking Adventurer/plate modulator and mike, $25.00. Gonset Super Six, $20. Heath VFO, $10. WA2CKB, 144-03 Barclay Ave., Flushing 55, N.Y. FL 3-0095.

HEATH Cheyenne, Comanche, HP-10 and HP-20 power supplies, AK-7 mount, spkr, all cables, hardware, manuals, perfect condx. Best offer over $125.00. K9CMN, 1115 East Knapp, Milwaukee.

SWAP: Former Graflex Model D, 3¼ x 4¼ camera, cut film septum, less lense, for BC-348 or similar receiver. W2DTE.

GONSET Mobile twins, G-66B, G-77A, and p/ss, in exclnct condx, $240 P.P. Gary Gordon, K6EWM, 1632 Cedar Ave., Long Beach 13, Calif.

BRAND New. Assembled Heath Pawnee; also new 2 meter J-Beam 16-el. Both for $240. F.o.b. Dallas. L. S. Frase, 33 Princess, Dallas, Texas.

A/C and D/c matching power supplies for G-76. Sell or trade. W5HOD, F. E. Hahnel, 9626 Livenshire Dr., Dallas, Texas.

FOR Sale: DX-60, $60. K7YEO, 2923 Smokey Lane, Billings, Montana.

SELL: 3.1 kc. mechanical filter for 75A4, $20. WB2CQMQ. Ron Lumachi, 73 Bay 26th St., Brooklyn 14, N.Y.

RTTY Polar relay test Set I-193A. Gud condx, $19.95. Jim Cooper, W2BVE, 834 Palmer Ave., Maywood, N.J.

WANTED: Jeweled Vibroplex Key. W. Staats, 118 S. Church, Ripley, West Va.

MUST Sell: Invader hi-power conversion kit, factory wired and tested, with tubes. Box never opened. Selling because of hospital bill. Best cash offer takes. K4LWU, 601 North Adams St., Henderson, Ky.

KWM-2, exclnt, never mobile. Trade for perfect Collins S/ Line. WA4RSN, 3909 Shamrock, Huntsville, Ala.

C-E 20A with QT-1, $90. H. Fairchild, 70 Samson Ave., Madison, N.J. 201-FR-7-1457.

CW-Operator Technician. Position open with City of Cincinnati for radio operation-technician with 2nd telegraph and 2nd telephone license. Salary: $150-162 weekly. Good fringes. Write J. P. Santa-Emma, Cincinnati Personnel Department, Room 215 City Hall, Cincinnati, Ohio 45202.

WANT For HRO-60; Coils AB-E-F-G-H-J, NFM 83-50 adapter. Instructograph with tapes. W1SPQ, 97 Richmond Lane, West Hartford, Conn.

BC221 w/book, reg P.S., $50. HRO 60-AC coil, $200; BC348-0, AC, $50. WA6YTR, 3489 Payne Ave., San Jose, Calif.

GOOD 75A-1 for sale. Priced to sell fast at $165.00. F.o.b. K1NNC, 100 S. Main, Unionville, Conn.

KNIGHT R-100A, spkr, S-meter, calibrator, $85; WRL TC-6A 6-meter transceiver, $40; GE FM transmitter and receiver, $50.00. WA8LMF, 517-ED2-2496.

FOR Sale: 75A4, serial 5111 .5, 3.1 filters vernier knob. Like new, $500.00; 75A4serial 448, .5, 3.1 filters, vernier knob. In mint condx, $425.00. These two receivers are identical in appearance and performance. Will ship F.o.b. Elgin, Illinois. L. E. Krafft, K9ZWJ, 10 Gromer Rd., Elgin, Ill.

HOWARD Radio Specials: KWM-1 and 516F-1, $449; 75A-4, $495.00; 30L-1, $465; 32V-1, $165.00; 75A-1, $190; 75A-2, $199; HT37, new, $445; used, $345; SBE33, new, $349; NC-183, $179 DX-100, $89; NC-270, new $209; RME 6900, $229; Invader 200, $355; 20A and VFO, $159; GSB100, $225. Free List. Box 1269, Abilene, Texas 79604.

BC221-AH frequency meter, orig. cal. book, elec. eye and audible tuning. Metal cabinet and separate regulated AC p/s, $75.00. Jones Micro-Match, 52 ohm unit with indicator meter, $18.50. W5DZ, 1040 Southwood Dr., Waco, Texas.

HUNTER Bandit 2000A, like new, $329; 1000A in sealed carton, $229; noise blanker for 75A4 new, 136C-1 with instructions, $59.00; VFO for 75A4, 70E-24; VFO for KWS-1, 70E-23; VFO for KWM-1, 70K-1, all new, $39.00 each; Collins 12V supply 516E-1, new, $125.00; PM-2 supply, $95.00. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

COLLINS KWM-2 with 351D-2 Mobile Mount, MP1 supply and one complete set Hy-Gain antenna 10-80. Used less than 10 hours. $1200.00. Walter L. O'Cain, W4DPN, 512 Amelia N.E., Orangeburg, S.C.

WANTED: Carbon mike desk stand, old style, with springs. Pay reasonable price. W3KWO, Box 900, Sharon, Penna. 16147.

"HOSS Trader" Ed Moory, offers demonstrator equipment at fantastic bargains on a cash and no trade deal. Swan-400, $339; Galaxy III, $269; TR-3, $449; SB-33, $289; Hunter Bandit 2000B, $439; KWM-2, $859; demo Ham-M rotor and new TH-4 beam, $169. New 75S-3, $549; SR-160, $299. New Hq-180C Hammarlund, minor freight damage, $329. Package deals: 75A-4 serial #5234 and KWS-1 and Collins supply, $1275. Used bargains: 2-B, $189; SX-111, $149; SR-150 sealed carton, $479; Heath Warrior, $169; Gonset GSB-101, $159; Johnson Ranger, $115; 32S-3, $495. Terms Cash. Ed Moory Wholesale Radio, Box 560, DeWitt, Arkansas. Phone WHitney 6-2820.

VALIANT wired with SB-10, 275 watts SSB (200 AM), both in exclnt condx, $300. Doc, K1OZR, Tel: LY 8-4138-LO 7-5409. J. Taddonio, 40 Newton Ave., Lynn, Mass.

DISTORTION and noise meter. General Radio type 732E Factory-checked. First check for $125.00 or you make offer W1AET, 315 Hamilton St., Worcester, Mass.

HAM BUERGER'S Used Equipment, money-back guarantee: B&W 5100B and SB, $349.95; Central Elec. 100V, mint condx, $495.00; Clegg Zeus, $495.00; Globe Champion, $249.95; Lakeshore Phasemaster 2B, $195.00. Trades. Write for free list. Ham Buerger's, Wyncote, Penna. Tel: CA 4-1740.

HAMMARLUND HX50 exclnt, 8 mo. old, $300; Drake 2A, all xtals, calibr, excl., 2BQ speaker, $210. W1FZY, 90 West Myrtle, Orange, Mass.

SB-300 and SB-400 for sale. Fabulous brand new Heathkits wired by a professional. Rec. has all opt. filters. Must sell. $625.00 takes all. Write F. Klein, RFD #1, Nashua, N.H.

BC 610D in operation. Usable as is or convert to linear. A steal at $95.00. Also, BC-757, $50.00. K1RSZ, Bob Cross, 21 Autum Circle, Hingham, Mass.

SELL: Drake 2A with 2-AQ spkr, Q-mult. Recently factory realigned, in mint condx, $175.00. WA8DPY, 11760 Auburn Rd., Chardon, Ohio.

NCX-3; NCX-A, dynamic mike, latest model. Perfect. Will ship package, original cartons, $350. Irvin Weinman, W9HMO, 4718 No. 80th St., Milwaukee, Wis.

COLLINS: KWM-2, #13111 with 399B5 xtal (Novice) adaptor installed with xtals, 7205-LSB, 7288-LSB, 7296-USB. Approx. 10 hours, $975. 516F1 six transistor power supply, $150; 351D2 mobile mtg., $80, or $1180 three. 75S-3, #13615 CW. 4.1 filters, $573; 32S3, #10363, $562. Approx. 100 hours, $1100 both. Johnson KW with 2 splatter chokes (SR500), and pair 3B28s (installed internally), $1250. Hear 7250 Kcs, 0400 GMT. Sell or trade Pathe 16 MM movie camera, case, wide angle, $250. Want (in trade) "Bertram" 25 ft. fiberglass cruiser and "Airstream" (international) trailer 26 to 30 ft. Cash F.o.b. mobile. Hank, W4IKM, 3917 Hilton Dr., Mobile, Ala.

COLLINS: 75A4 per 4154, KWS-1, ser. 1321, Jones Micro-Match, Astatic 10-D less than 100 hours on all, $1200. Haymes, 51 Alpine Way, Huntington Station, L.I., N.Y. Tel. evenings: MY 2-3176.

SELLING Out: VHF and low-band station: NC-303, Johnson 6 & 2, Eico modulator, Heathkit power supply, Ameco 2M Nuvistor converter, Ameco 6M converter, $550. Collins 75S-1 and Johnson Invader, $550. WA2QAO, 3110 Kingsbridge, Terrace, Bronx, N.Y. Tel: 212-K-18-2982.

NATIONAL NCX-3 SSB Transceiver. Your best offer. K1VUX, Phone (617) 298-0196.

ESTATE Of WØCOX: Hallicrafters HT-32B, $395.00; 101A, $245.00; Johnson Matchbox 275 w w/o coupler, $35.00; T-R switch, $18.00; Signal Sentry, $10.00. All are in excint condx. Phil Hoover, WØFTS, 2726 Forest Road, Davenport, Iowa.

FOR Sale: KWM-2, p/s. $675.00; 75A-4, perf. condx, $375. W2LEC, Shrewsbury, N.J.

HAMMARLUND HQ-110A with clock, Heathkit Apache and Heathkit Seneca for sale to the highest bidder. All or part. All inquiries will be answered. Apache and HQ-110AC in mint condx. Seneca needs some work done on it. WB2AJH, Ed Winters, 52-24 65 Place, Maspeth, L.I., N.Y. 11378.

SELL: DX-100B, $130, SB-10, $55.00; SX-111, $160.00. Richard Fortune, R.D. #1, Pulaski, N.Y.

HALLICRAFTERS 101A receiver. Same as new $200. W4ALG. Meade Johnston, 2625 Broad St., Tuscaloosa, Ala.

FOR Sale: All components for KW p/s, including pwr. xfrmr, 2 chokes, 2 filter condensers, and 2 bleeder resistors. Max. output: 3500 w. at 400 Ma., $60.00. Also motor driven Variac, 110v. at 18 amps. $35.00 Jim Herb, K3UHA, Snydertown, Penna. Tel: 717-672-2338.

SELL: Apache, $175; HQ-170, $235.00. Can't erect antenna in city apartment. Richard Zwirko, K1HTV, 219 Dauntless Lane, Hartford, Conn. JA. 7-7982.

AMATEUR License course. Preparation for Novice, Technician, and General Class licenses will be offered at the New York City Board of Education Adult Community Center #59: Springfield Boulevard and Merrick Road, Springfield Gardens, L.I., N.Y. Classes will open in October and applicants are requested to write for applications before October 8th or contact W2HNG, 1335-30 232 St., Springfield Gardens 13, L. I. for further data. After October 8th call at school personally.

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.

FOR Sale: Collins KWS-1 transmitter S/N 969 new final tubes 7580 up dated at factory 3 years ago; $550.00. 75A-4 receiver S/N 3673 3.1 filter reduction knob, $350.00. HT-37 transmitter like new condx, $225.00. TA-33 Jr beam with 100 ft. RG8-U foam cable, $50.00. All of the above equipment is very clean and in good working condition. W9FAA, John J. Dilworth, Cassville, Wisconsin 53806. Phone 7255407.

ENTIRE Station, mint condx. Rarely used. Apache and SX-100. Both latest models. Make offer. Local only. WAØIMS, James Plonka, 9431 Tennyson, Overland 14, Mo.

FOR Sale: Collins 75A-4 ser. #3811 reconditioned, 3 kc. filter, vernier dial, one owner. $425.00. 800 cycle mech. filter, $30 extra. Earl Hoening, KØJSI, Ely, Iowa, 52227.

SELL: HT-9, gud condx. Spare 814, all coils. $100. J. P. Hyde, Nokesville, Va.

SELL: Eico 720 and 730, $100. K5FPU, Box 629, Enid, Okla.

SALE: Matching Heath station. Marauder, $295; Warrior, $190. Monitor scope, $45.00. All less than 1 year old, and in perf. wkg. condx. Also TH-3 Triband beam, $40. Home brew rotor w1/3 H.P. G.E. motor and selsyns w/indicator, $75. Call collect. T. E. Smith, WA8CVR, 5555 Driftwood Rd., Columbus 24, Ohio.

SELL: Drake 2B with 2AQ, $205; Apache TX1, $185. HE45B transceiver including HE61A VFO and Saturn 6 antenna, $100; Heath HP20 power supply, wired, $22.00. All perfect with manuals. Sry, no trades. Len, K1TAX, 74 Turtleback Rd., Wilton, Conn. Area code 203A Phone 762-7865.

COLLINS 75s-3, $460; Gonset GSB-100, $200. Both 2 years old. Mint condx. WA4JAY, 207 Palm Ave., Auburndale, Fla.

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.

APACHE: $165.00. Englund, 1409 Jadwin, Richland, Washington.

FOR Sale: DX-60, in gud condx: $45.00. James Stafford, 478 Oriole, Philly 28, Penna.

HOW TO MAKE PRINTED CIRCUITS: Technical information supplies Silkscreens custom made Large sample fiberglass circuit board $1.00 post paid. Mitchill, W5HOW, Rte 2, Box 105, Humble, Texas.

6N2, $105; Eico modulator, $45.00; Heath HP-20, $30; package deal: $175.00. Swan-175, $155. K1TKZ, Pierce, 57 Gifford, West Hartford, Conn. Tel: 203-233-6763.

SWAP: For sail, steam or power boat: Collins 62S-1, 32S-3, 75S-3, 30L-1, 312B4, 516F and extras. Ed Dros, W2PVR, 154 Reville St., City Island N.Y. 10464.

APACHE TX-1, A-1 plus cond. RME-4350-A, A-1. Offer for TX-1 or both. Offers?? K1MTM.

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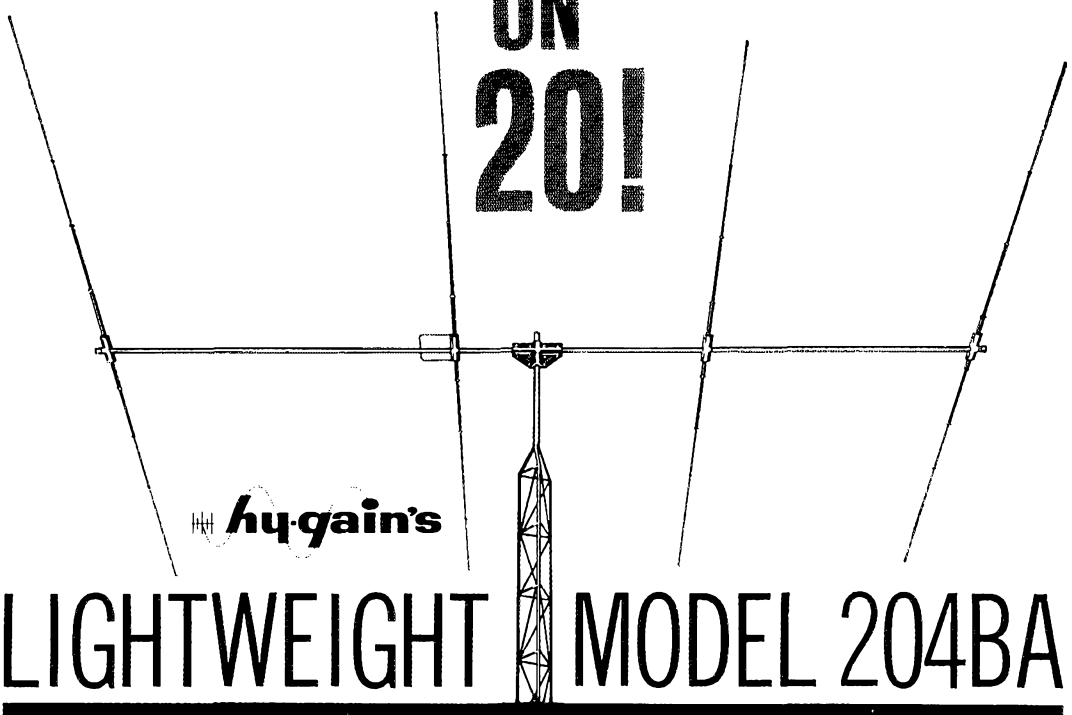
A NEW TIGER ON 20!

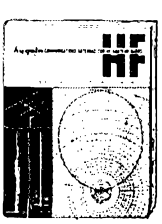


hy-gain's

LIGHTWEIGHT MODEL 204BA

You asked for it...Hy-Gain built it...a high performance DX beam for 20 meters that is lightweight enough to mount on a lightweight tower...rotate with a standard Ham rotator...yet rugged enough to insure maximum mechanical and electrical reliability. Seamless aluminum construction with taper swaged elements provide greater stability...low wind resistance. Rugged machine formed aluminum boom to mast and element to boom brackets insure maximum durability. It's factory pre-tuned using Hy-Gain's all-new linear Beta Match...SWR is less than 1.5:1 over the entire 20 meter band. Half power beam width in the E Plane is 63 degrees. Sensational forward gain; F/B ratio averages 23db. Tuned to 14.1 mc on CW with a range of 14.0 to 14.2 mc; 14.275 mc on Phone with a range of 14.2 to 14.35 mc. 2" O.D. Boom is 26' long; longest element, 36'6". A quality built, super performance beam...easily installed for use with lightweight equipment...Hy-Gain's all-new Model 204BA...available now from your favorite Hy-Gain distributor at **$89.95** Ham Net.

Send for your copy of Hy-Gain's new HF Antenna Catalog...16 pages of pictures and descriptions of Hy-Gain high performance Base Station and Mobile Antennas and Accessories...it's FREE!

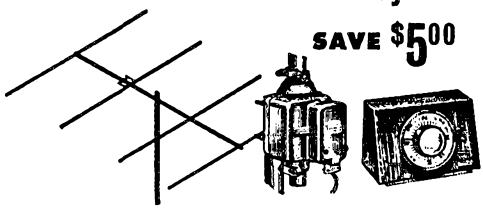


HY-GAIN ANTENNA PRODUCTS CORPORATION

8419 N.E. Highway 6—Lincoln, Nebraska

from ALLIED Money-Saving hy-gain Antenna Deals!

hy-gain 64B 6-Meter 4-Element Beam with Alliance U-100 Rotator System



SAVE $5.00

HERE'S THE MONEY-SAVING COMBINATION:

64B 6-Meter Beam. Regularly.....$21.50
Alliance U-100 System. Regularly.. 28.20
Regular Price $49.70
ALLIED'S SPECIAL PRICE, ONLY... **$44.70**

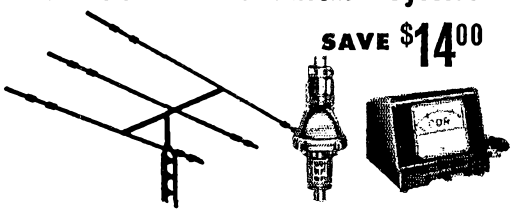
HY-GAIN 64B 6-METER BEAM—4 elements giving max. forward gain; Beta match handles 1 kw; 9'8" elements; boom, 10'; turning radius, 5'4".

ALLIANCE U-100 AUTOMATIC ROTATOR SYSTEM—Provides 8 compass points—just set the dial—antenna stops when desired direction is reached. Compact rotator (7¾ x 5¼ x 8"), weather-sealed and factory lubricated. 1-rpm motor reverses instantly; magnetic brakes prevent overshoot and drifting. Mahogany plastic automatic control unit (7 x 4½ x 4"). Less control cable. 110-120 v., 50-60 cycle AC.

23 SU 169-2-AJ. SAVE $5.00! Combination 64B 6-Meter Beam & Alliance U-100 Rotator System. Shpg. wt., 20 lbs.

ALLIED'S SPECIAL COMBINATION PRICE, ONLY **$44.70**

hy-gain Thunderbird Jr. Tri-Bander with CDR TR-44 Antenna Rotator System



SAVE $14.00

HERE'S THE MONEY-SAVING COMBINATION:

Thunderbird Jr. Tri-Bander. Reg...$69.95
CDR TR-44 Rotator. Reg... 58.75
Regular Price $128.70
ALLIED'S SPECIAL PRICE, ONLY... **$114.70**

THUNDERBIRD JR. TRI-BANDER. For 10, 15 and 20 meters. 3 elements. Handles 600 watts P.E.P.; takes up to 300 watts AM. Delivers maximum forward gain; up to 25 db front-to-back ratio; SWR of less than 1.5:1 at resonance. Turning radius 14'9"; boom 12'.

CDR TR-44 ROTATOR SYSTEM. Handles full-size 20-meter beams. Instant reversing; indicator readable with motor off. Weather-designed rotator; 50 heavy-duty bearings in two 6½" ball races; heavy die-cast aluminum housing. Control unit with large meter calibrated in compass points and 3" increments. For mast or pipe up to 2⅛" O.D. Less control cable. 110-120 v., 50-60 cycle AC.

23 SU 170-2-AJ. SAVE $14.00! Combination Thunderbird Jr. Tri-Bander & CDR TR-44 Rotator. Shpg. wt. 46 lbs.

ALLIED'S SPECIAL COMBINATION PRICE, ONLY **$114.70**

Combination Deal with TH-3 Tri-Bander

SAVE $20.00 CDR TR-44 Rotator System with TH-3 Tri-Bander: For 10, 15 and 20 meters. Less than 1.15:1 SWR. 3 elements. High gain. Boom 14'; turning radius 14'8".

23 SU 171-2-AJ. SAVE $20.00! TH-3 Tri-Bander & CDR TR-44 Rotator. Shpg. wt. 57 lbs.

ALLIED'S SPECIAL COMBINATION PRICE, ONLY **$138.50**

hy-gain for MOBILE TIME!

NEW "TOPPER" ANTENNAS

Efficient top-loaded single-band antennas. Feature "Stabl-Fold" mast for low garaging and spring-loaded quick-disconnect for interchanging 6-ft. radiators (capsules) to shift bands. TM-36 3-ft. mast has std. ⅜"-24 stud. Fiberglas capsules have encapsulated coil and telescoping tuner rod for easy adjustment to resonant frequency. Overall ht. of capsule and mast is approx. 102".

Stock No.	Type	Description	Lbs.	Each
86 SX 250-AJ	TL-10	10M capsule	1	$ 7.95
86 SX 251-AJ	TL-15	15M capsule	1	7.95
86 SX 252-AJ	TL-20	20M capsule	1	7.95
86 SX 253-AJ	TL-40	40M capsule	1½	9.95
86 SX 254-AJ	TL-75	75M capsule	1½	11.95
86 SX 255-AJ	TM-36	mast section	2	7.95

6 AND 2-METER HALOs

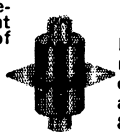
HH6BK 6-METER HALO SYSTEM. Center-support type. With halo, bumper mount & mast. 52-ohm beta match. 6 lbs. **86 SX 258-AJ.** Only.....$16.50

HH2BA 2-METER HALO. 14" dia. tubing. 52-ohm match. 3 lbs.
86 SX 260-AJ. Only.....$5.95

86 SX 263-AJ. HMBA MAST. Takes halos singly or together. 5' high. 4 lbs. Only.....$4.95

86 S 295-AJ. BPRS BUMPER MOUNT. Cadmium-plated; with stainless strap. 1½ lbs. Only....$5.97

New Sure Safe Lightning Arrester



Hy-Gain's LA-1 is the only lightning arrester on the market today that will safely by-pass to ground 10 or more direct lightning strokes! For installation in any 52 or 72 ohm coax feedline. 5 oz.
86 S 566-AJ. Only..... **$19.95**

ALLIED STOCKS ALL HY-GAIN ANTENNAS AVAILABLE ON CREDIT FUND TERMS

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ORDER TODAY FROM

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America's Ham Headquarters

Announcing an extraordinary achievement in amateur radio

THE NATIONAL HRO-500 RECEIVER

The National HRO-500 is the result of thirty years of "improvement of the breed" From the first HRO *Senior* of 1933 to the present, the HRO series has been almost legendary. The HRO-500 continues this proud tradition, and incorporates important technological advances resulting from National's leadership in the field of solid state physics, frequency standardization, and frequency synthesis.

By any criterion, the HRO-500 is extraordinary.

1. Design Concept: The HRO-500 is totally solid state. Frequency is determined by a phase-locked crystal synthesizer* feeding a VFO-controlled tunable IF. Similar circuit techniques are found only in advanced military communications equipment.

2. Reliability: The use of transistors throughout assures amazing reliability as a result of their enormously long life and minimum heat generation. The HRO-500 is hand-wired . . . compact . . . but *not* miniaturized.

3. Versatility: The HRO-500 may be operated anywhere . . . from flashlight cells, 12 volt car battery, or from 115V/230V 50/60 cycle sources. Total battery drain is less than that required for two dial lamps.

4. Frequency Coverage: *The HRO-500 covers the entire VLF through HF spectrum* . . . Five kilocycles through 30 Mc. in 60 synthesized 500 Kc bands, with equal stability and dial accuracy throughout its tuning range. No need to confine operation to ham bands only . . . the HRO-500 provides total coverage of MARS, commercial, foreign broadcast, marine, VLF communications, test and experimental frequencies. All required heterodyne frequencies are generated by the frequency synthesizer.

5. Dial Calibration and accuracy over *the entire tuning range* is one kilocycle, employing a linear VFO and National's famous PW epicyclic dial mechanism. 1 Kc divisions are ¼" apart, allowing easy interpolation to 200 cycles or better. VFO tuning rate is identical on all bands.

6. Stability: The HRO-500 employs a 500 Kc reference crystal standard, output of which is synthesized and phase-locked to produce crystal-stable high frequency oscillator signals. The VFO is electronically regulated. The use of transistors throughout practically eliminates internal heat generation. Long term stability from turn-on is better than 100 cycles over any ten-minute period, including supply voltage variation of ±10% and ambient temperature variations of 30° C.

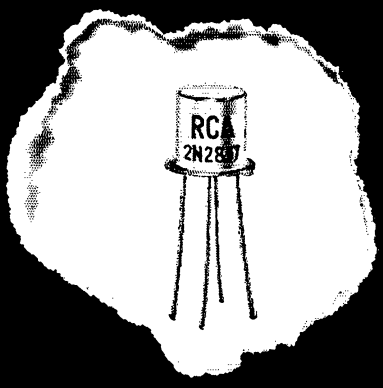
7. Selectivity: The HRO-500 employs a *tunable* six-pole filter to meet any selectivity requirement. Bandwidths available are 500 cycles, 2.5 Kc, 5.0 Kc, and 8.0 Kc . . . the widest selectivity range of any amateur receiver. *Passband Tuning* in the 500 cycle and 2.5 Kc positions provides ease of sideband selection and adjacent channel interference rejection found in no other receiver manufactured today. A *Rejection Tuning* network allows rejection of interfering heterodynes by 60 db.

8. HRO-500 sensitivity and noise figure is substantially superior to the previous standard of comparison, all earlier HRO models! Amateur net price will be approximately $1000.00, with delivery this fall. If your requirements demand the finest amateur receiver obtainable, at *any* price, the National HRO-500 *is* your only choice.

*Patent Pending

World Wide Export Sales: Ad. Auriema, Inc., 85 Broad Street, NYC Canada: Tri-Tel Associates, 81 Sheppard Ave. W., Willowdale, Ontario

NATIONAL RADIO COMPANY, INC. **37 Washington Street, Melrose, Mass. 02176**



NEW "OPENING" IN UHF

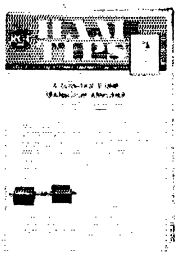
RCA silicon transistor 2N2857 delivers very high signal gain with amazingly low noise figure—in receivers/converters operating up to 1000 Mc

For the amateur doing serious work in the world above 30 Mc, RCA-2N2857 opens new possibilities in receiver/converter performance at VHF and UHF.

Operating in a 30-or 60-Mc if amplifier, for example, this remarkable npn silicon transistor can deliver a noise figure as low as 2db ($V_{CE}=6V$; $I_C=1_{ma}$; $R_G=400$ ohms). And in 450-to-30Mc converters, the 2N2857 can produce signal gains as high as 15db—with as little as 7.5 db noise figure! Power dissipation capability is 300 milliwatts at 25°C case temperature. Noise figure variation is only ± 0.5db over a temperature range of −40° to +100°C.

Designed for UHF, specified for UHF, and 100%-tested for UHF, RCA-2N2857 offers a performance level in amateur UHF receiver equipment never before achieved by a commercially available silicon transistor. It can be operated as an amplifier to 1000Mc—and as a common-base oscillator to 1500Mc.

Available from your Authorized RCA Distributor



How to Build a Very Low-Noise UHF Transistor Amplifier

Complete construction details and circuits are worked out for you in HAM TIPS, Vol. 23 No. 4. Free, from your RCA Distributor. Or write: Commercial Engineering, Sect. J-37-M RCA Electronic Components and Devices, Harrison, New Jersey.

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